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**Stern et al.**

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(54) **MULTI-OPTION SOURCING OF CONTENT**

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filed on Mar. 15, 2013.

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**H04N 21/4722** (2011.01)  
**H04N 21/462** (2011.01)  
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**H04N 21/61** (2011.01)  
**H04N 21/81** (2011.01)  
**H04N 21/845** (2011.01)

(52) **U.S. Cl.**

CPC ..... **H04N 21/4722** (2013.01); **H04N 21/4307**  
(2013.01); **H04N 21/4312** (2013.01); **H04N**  
**21/44016** (2013.01); **H04N 21/4622** (2013.01);

**H04N 21/482** (2013.01); **H04N 21/6125**  
(2013.01); **H04N 21/8133** (2013.01); **H04N**  
**21/8153** (2013.01); **H04N 21/8455** (2013.01)

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21/482; H04N 21/4307; H04N 21/4312;  
H04N 21/44016; H04N 21/6125; H04N  
21/8133; H04N 21/8455

See application file for complete search history.

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*Primary Examiner* — Benjamin R Bruckart

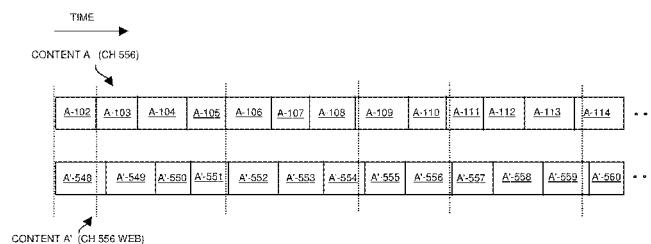
*Assistant Examiner* — Jen-Shi Huang

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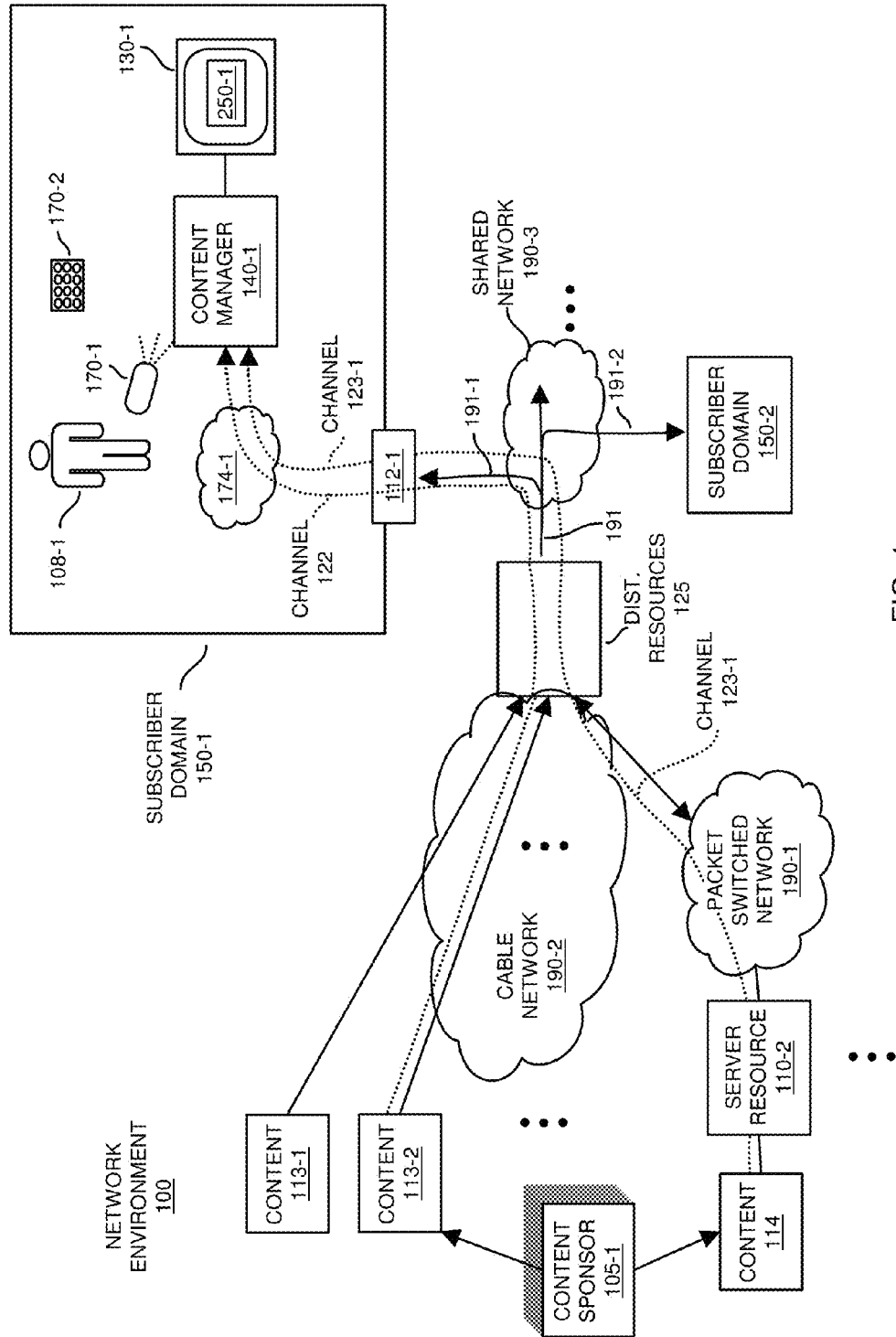
(57) **ABSTRACT**

A content manager initiates play back of corresponding content on a display screen. The corresponding content is received on a primary broadcast channel selected amongst multiple available channels. During play back of the corresponding content, the content manager receives selection of over-the-top content available over a secondary channel with respect to the primary broadcast channel. The over-the-top content includes supplemental content associated with the corresponding content. In response to receiving the selection of over-the-top content, the content manager: i) retrieves the over-the-top content, and ii) initiates play back of the over-the-top content on the display screen. Accordingly, the user can selectively retrieve and play back supplemental content associated with a primary broadcast channel.

**29 Claims, 26 Drawing Sheets**



MAP 1859	
A-102	A'-548
A-103	A'-549
A-104	A'-550
A-105	A'-551
A-106	A'-552
A-107	A'-553
⋮	⋮



CHANNEL	7:00 PM	7:30 PM	8:00 PM	8:30 PM
...	...	...	...	...
555	CBS	DRAMA SHOW	COMEDY	
556	CNN	NEWS	NEWS	NEWS
556 WEB	CNN	SUPPLEMENTAL CONTENT ACCESS		
557	ESPN	NFL GAME		
557 WEB	ESPN	SUPPLEMENTAL CONTENT ACCESS		
558	DISNEY	MOVIE	CARTOON	
...	...	...	...	...

SELECTION WINDOW 260

CONTENT GUIDE 250-1

FIG. 2

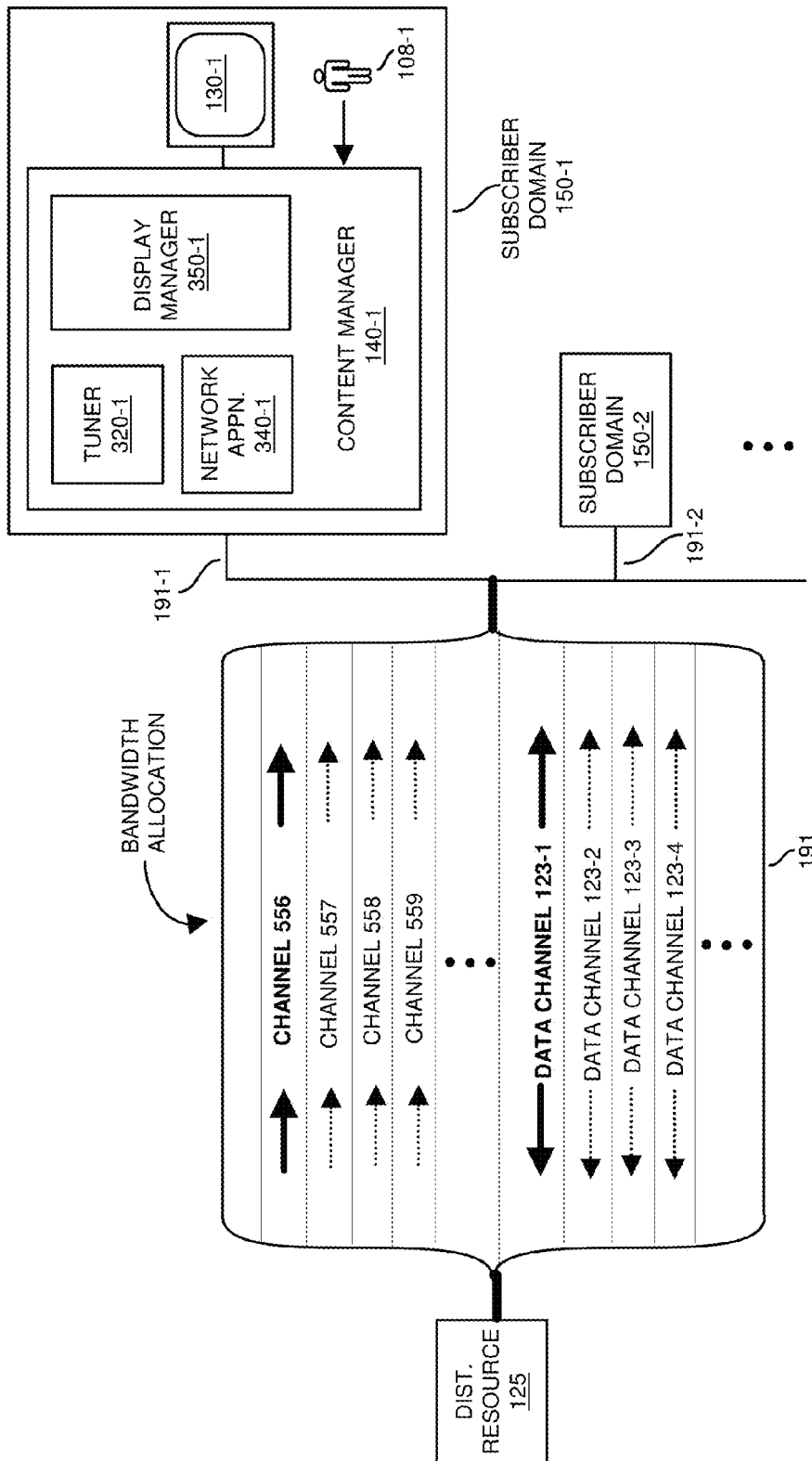


FIG. 3

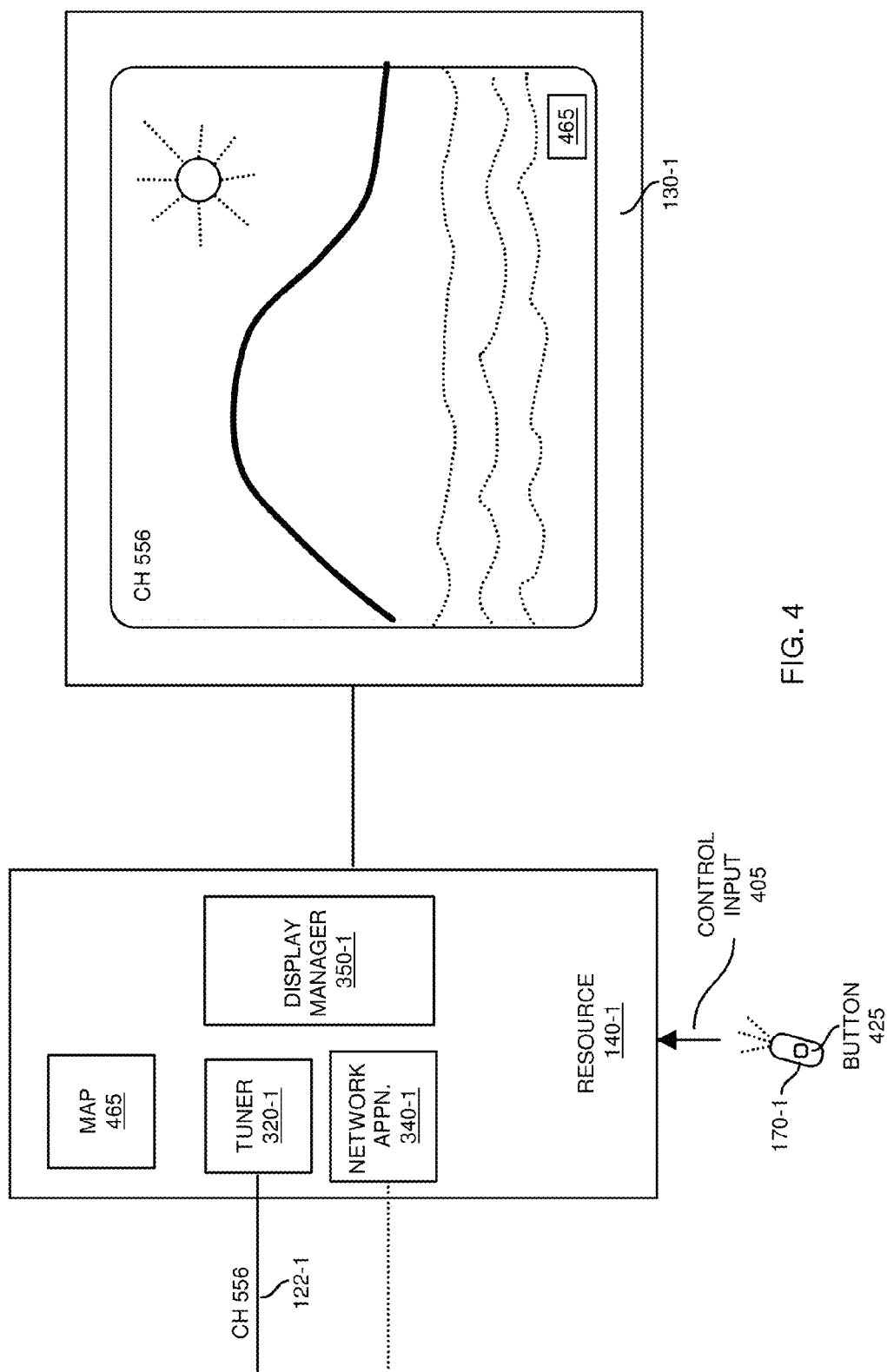


FIG. 4

MAP 465		
<u>VIEWED CHANNEL</u>	<u>NETWORK ADDRESS</u>	<u>SERVER RESOURCE</u>
⋮	⋮	⋮
555	N/A	N/A
556	CNN.COM (NETWORK ADD. #1)	110-2
557	ESPN.COM (NETWORK ADD. #2)	110-3
558	N/A	N/A
⋮	⋮	⋮

FIG. 5

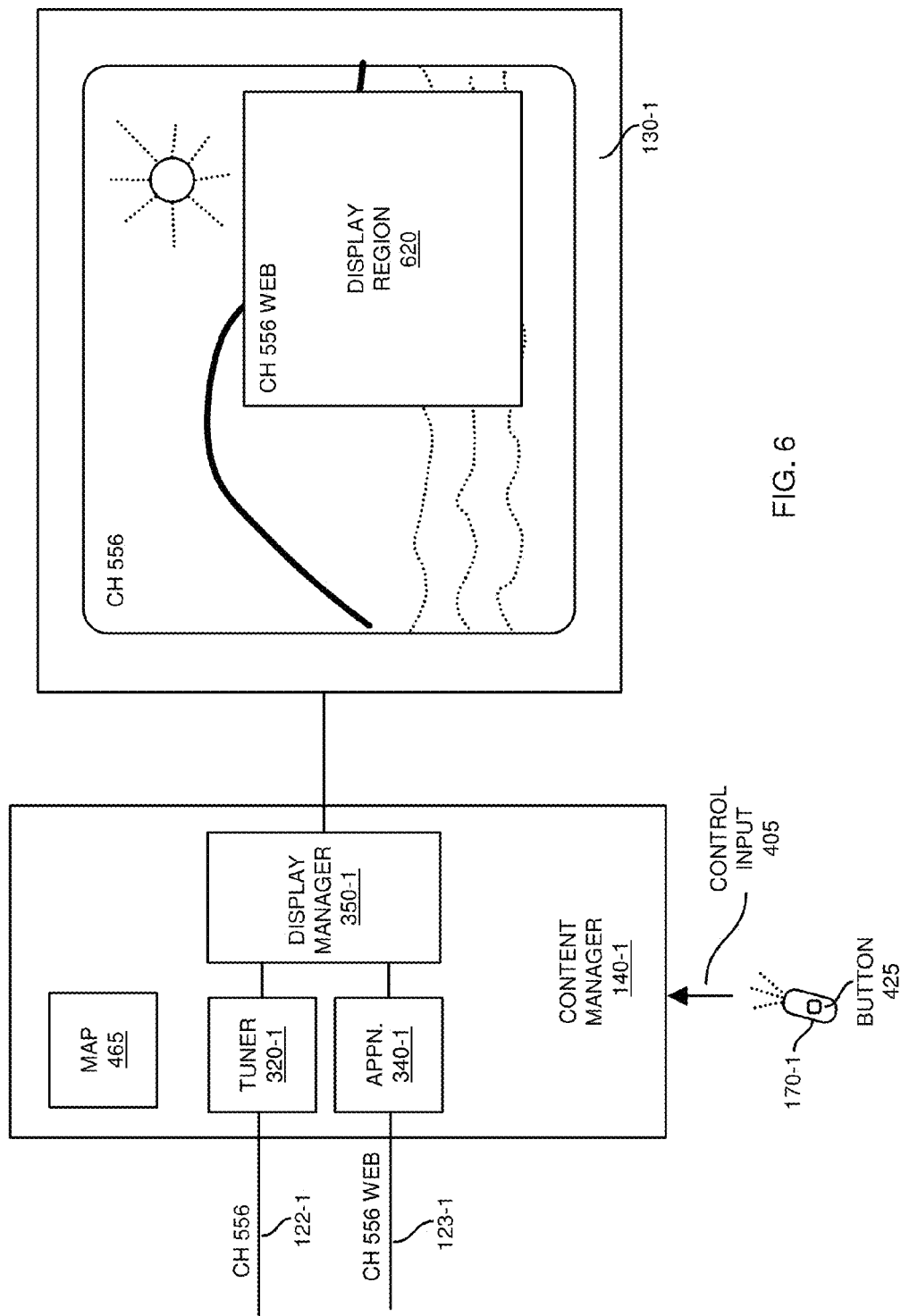


FIG. 6

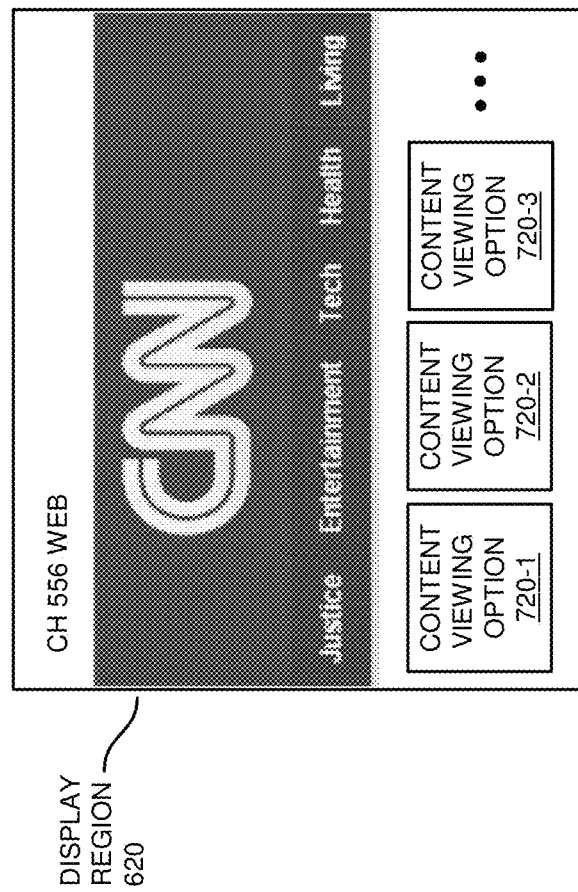


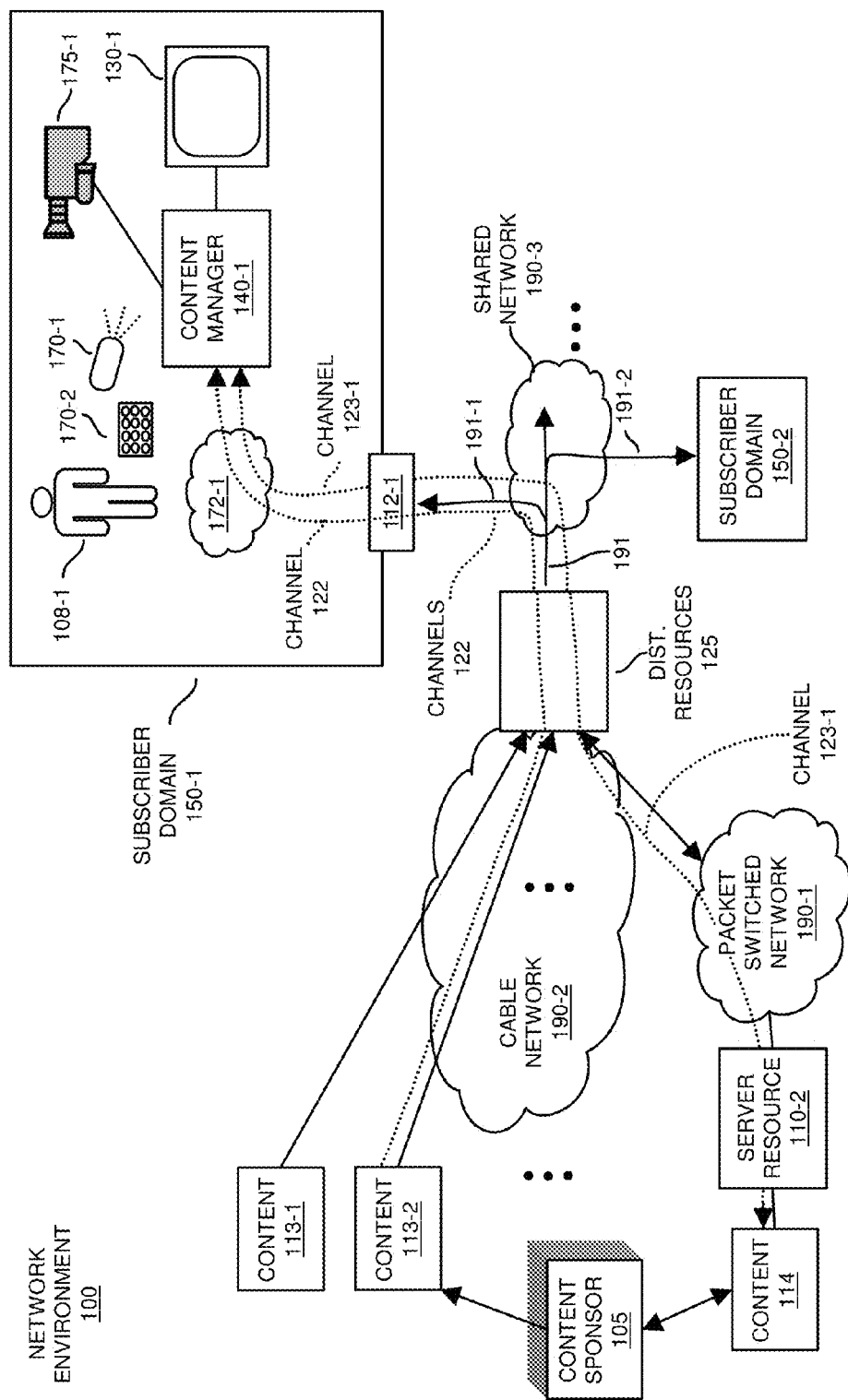
FIG. 7



CHANNEL	7:00 PM				8:00 PM				9:00 PM				10:00 PM				
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
555	CBS	DRAMA SHOW				COMEDY											
556	CNN	NEWS				LIVE INTERVIEW WITH TED TURNER				NEWS							
556 WEB	CNN					INTERACTIVE TV											
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
567	FOX	GERALDO SHOW LIVE				AMERICAN IDOL											
567 WEB	FOX	INTERACTIVE TV								INTERACTIVE TV							
568	DISNEY	MOVIE				CARTOON											
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		

FIG. 8

CONTENT  
GUIDE  
250-2



E.G. 9

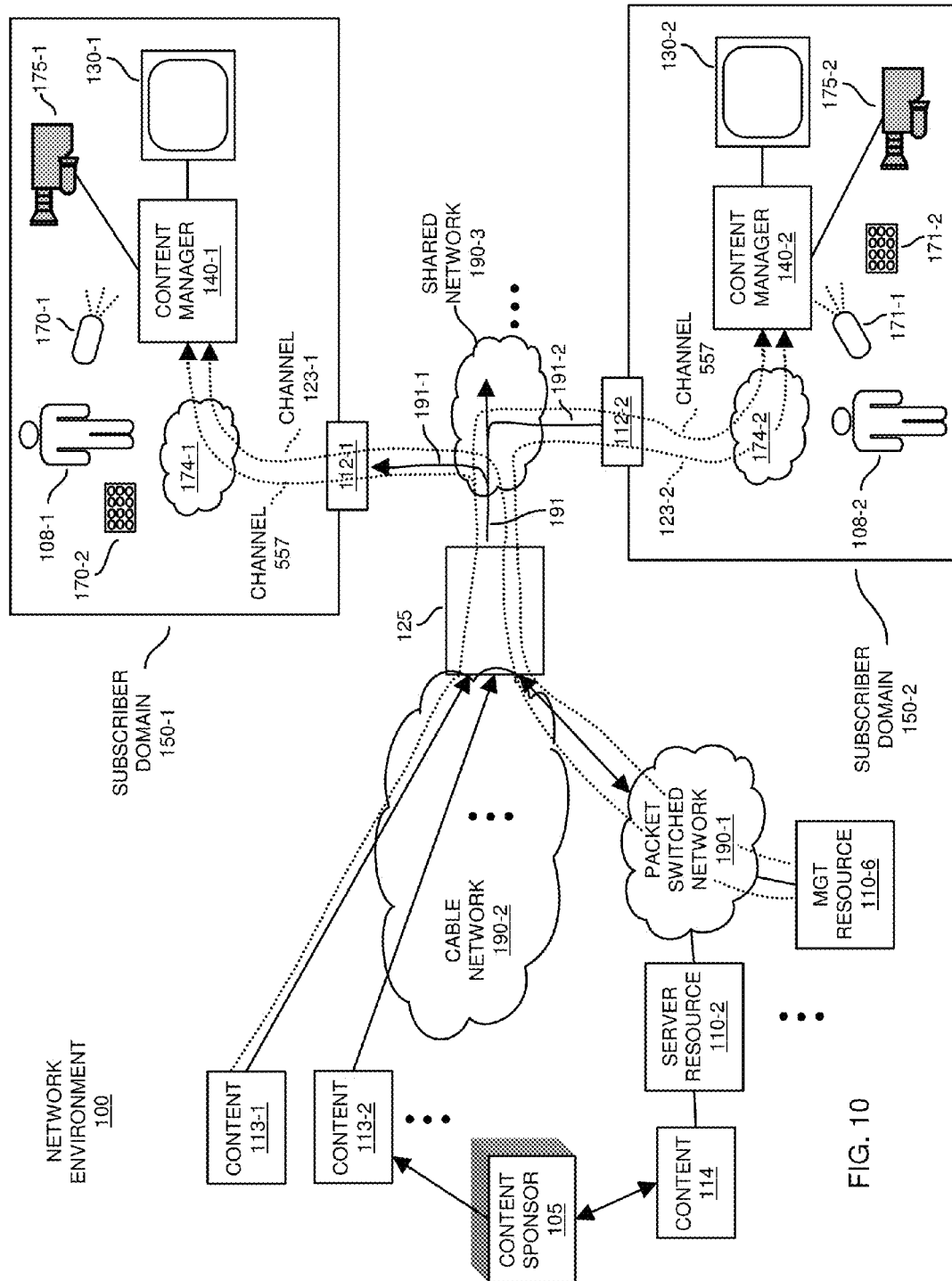


FIG. 10

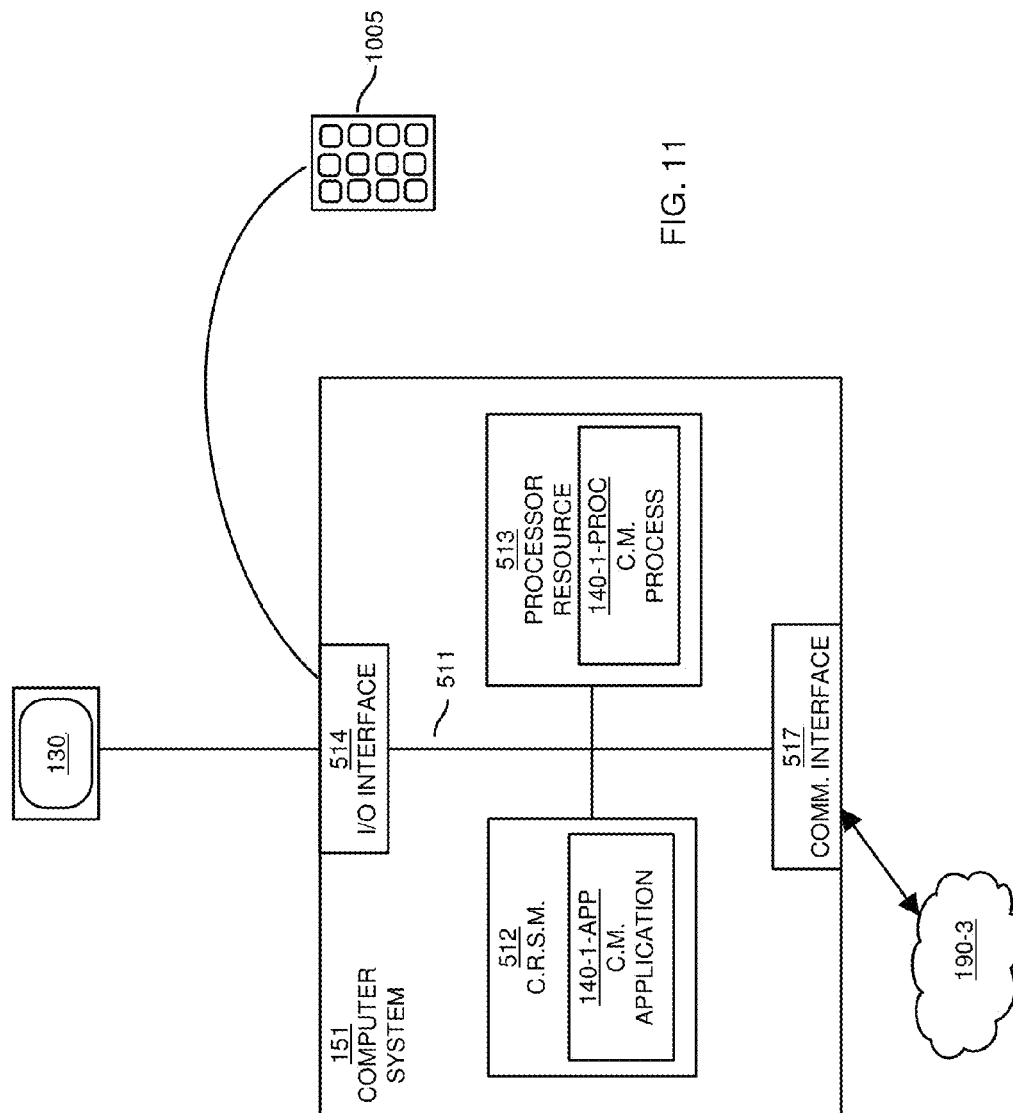


FIG. 11

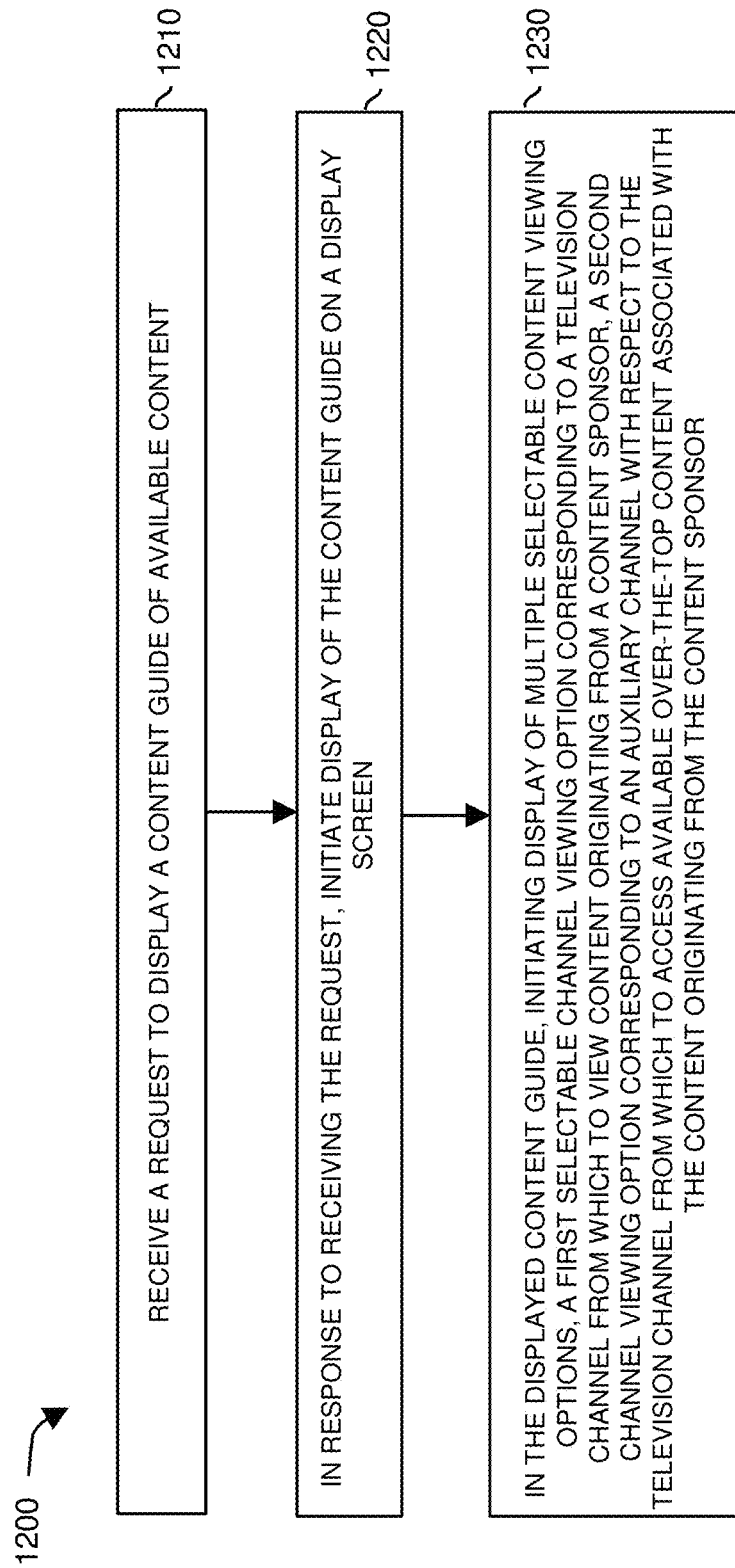


FIG. 12

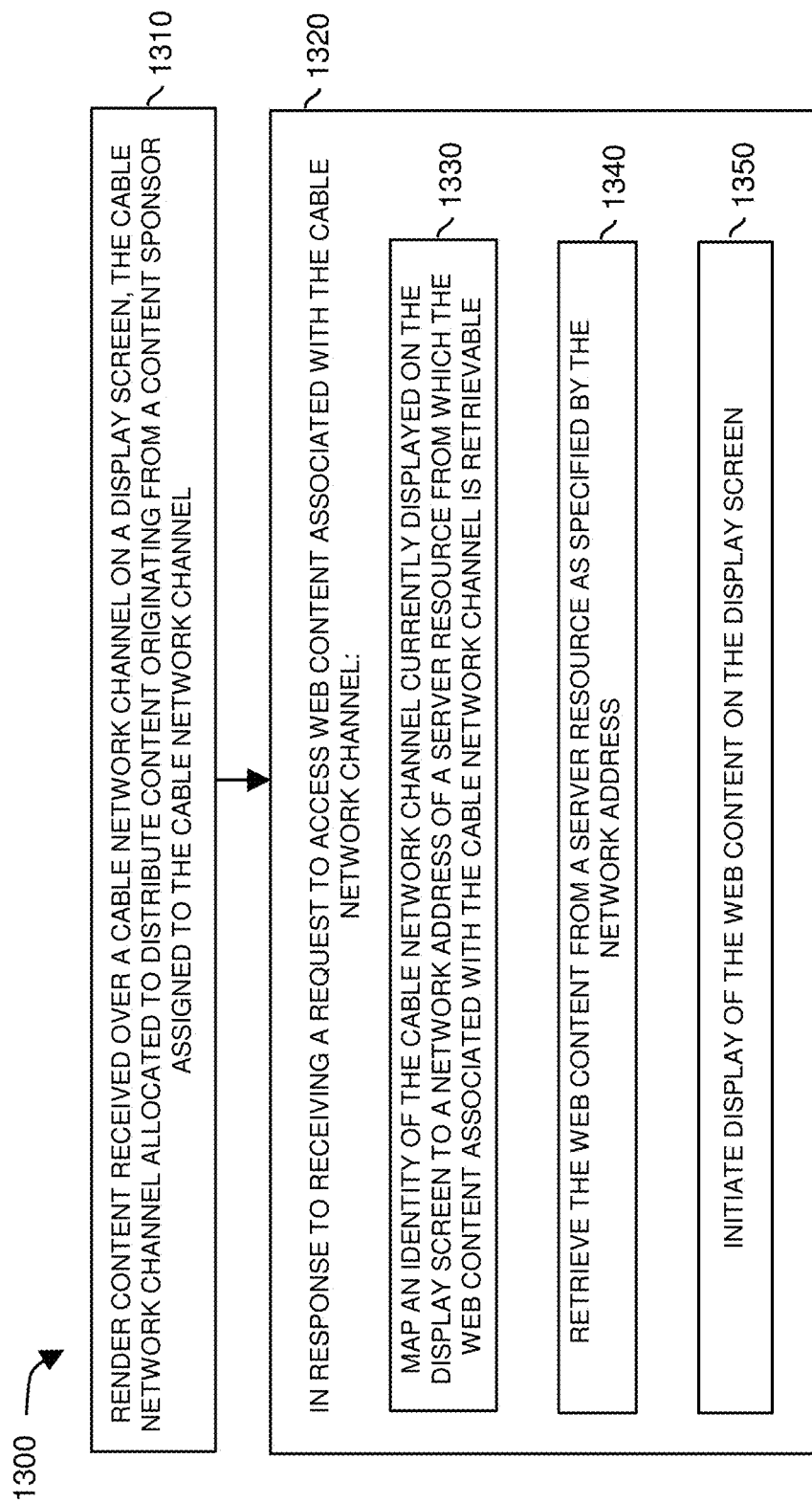


FIG. 13

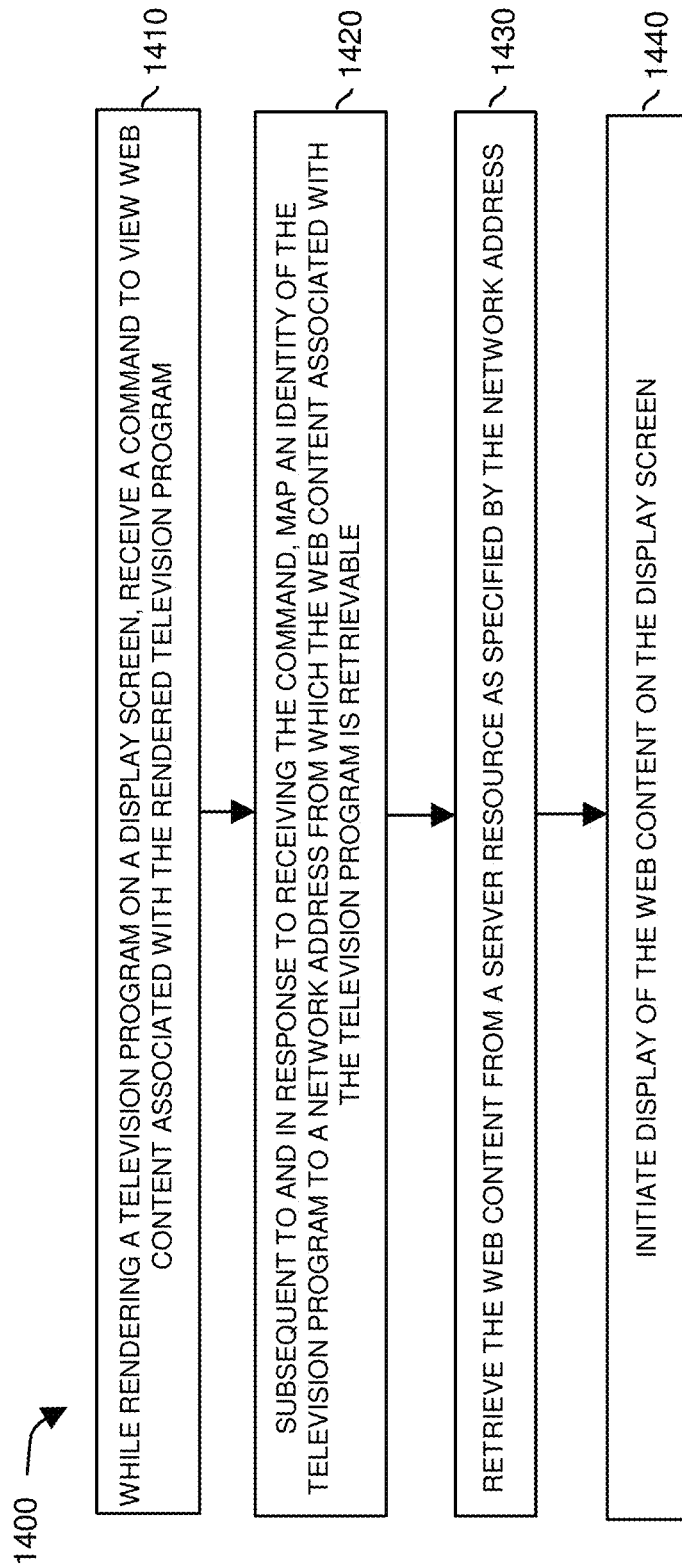


FIG. 14

CHANNEL	7:00 PM	7:30 PM	8:00 PM	8:30 PM
555	CBS	DRAMA SHOW	COMEDY	
556	CNN	NEWS	NEWS	NEWS
556 WEB	CNN	SUPPLEMENTAL CONTENT ACCESS		
...	...	...	...	...
950	ESPN2	COLLEGE BASKETBALL GAME #1	COLLEGE BASKETBALL GAME #2	
951	FACEBOOK	ACCESS YOUR PERSONAL ACCOUNT		
952	NETFLIX	ACCESS NETFLIX CONTENT GUIDE		
...	...	...	...	...

SELECTION WINDOW 260

CONTENT GUIDE 250-3

FIG. 15



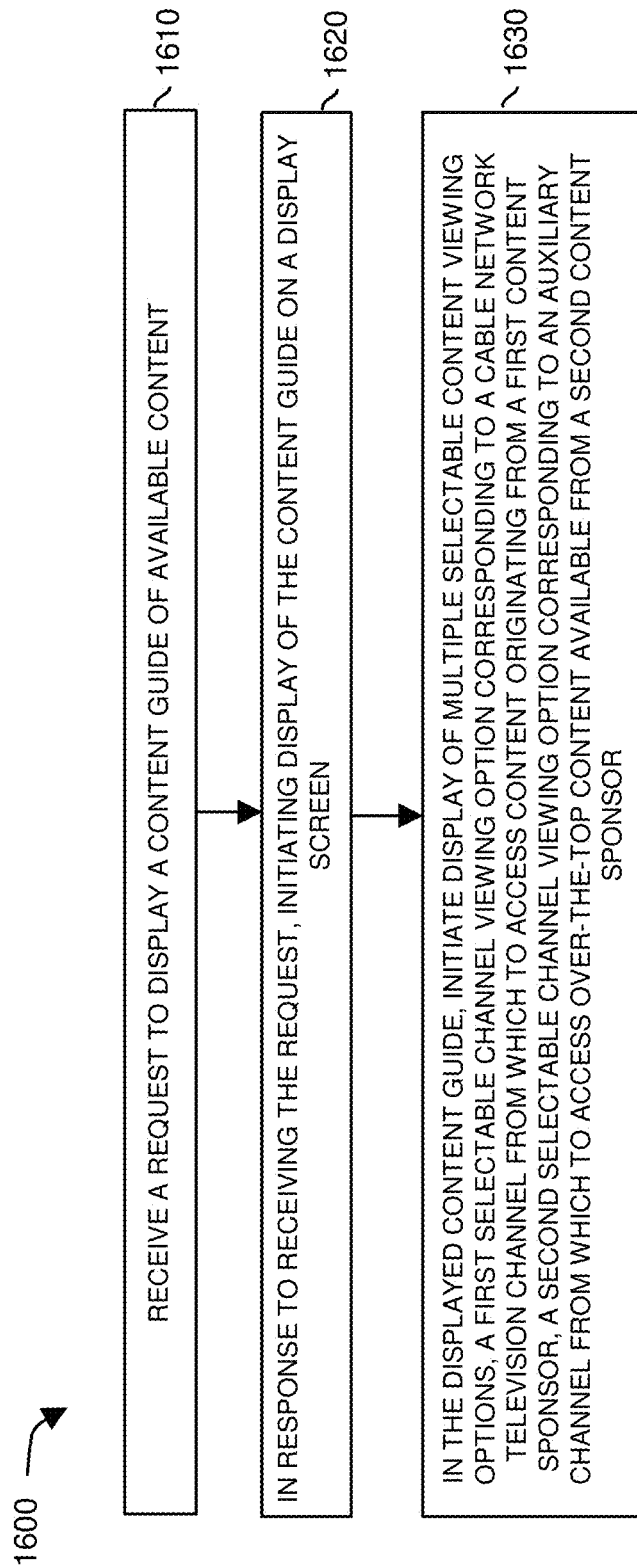
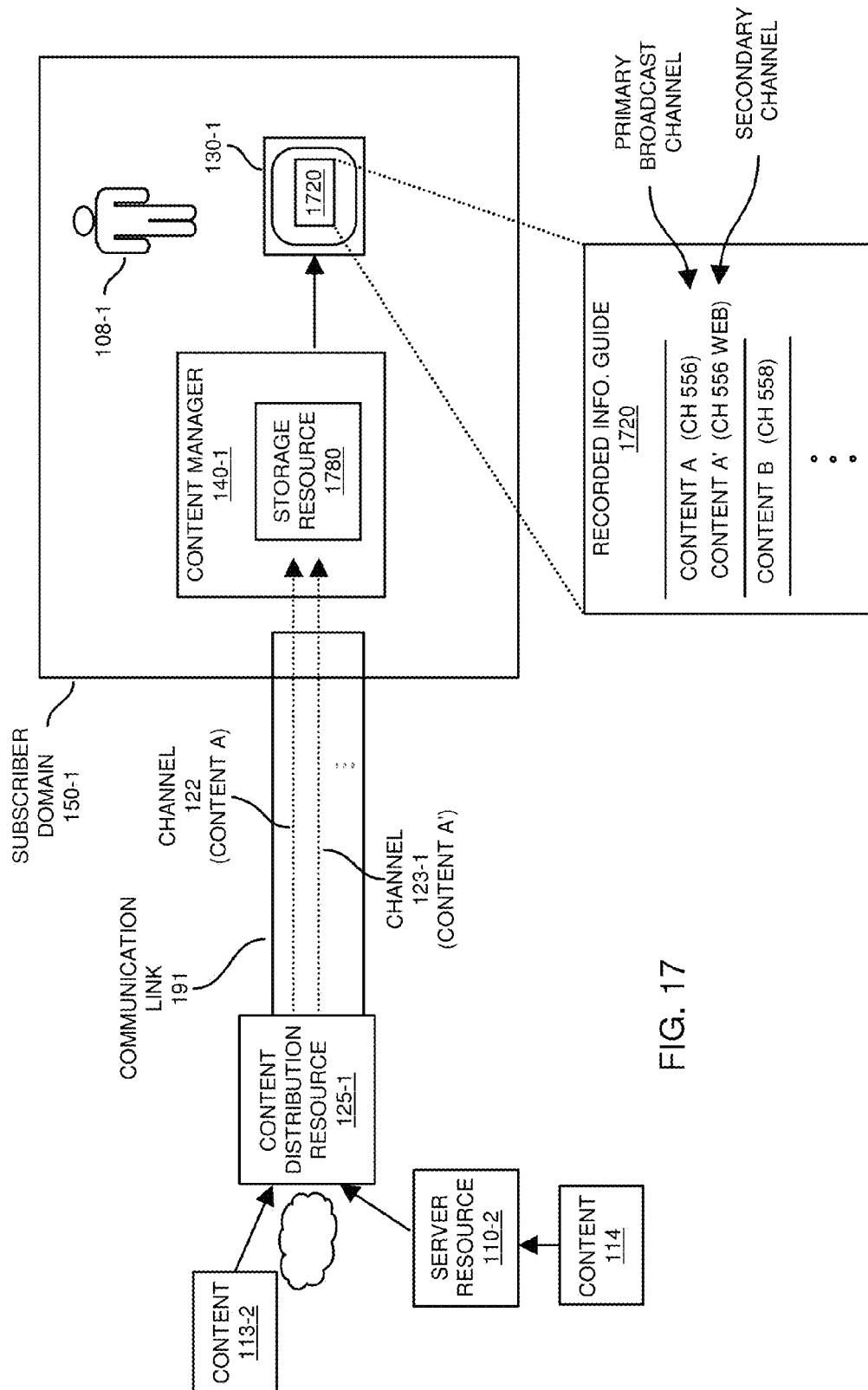


FIG. 16



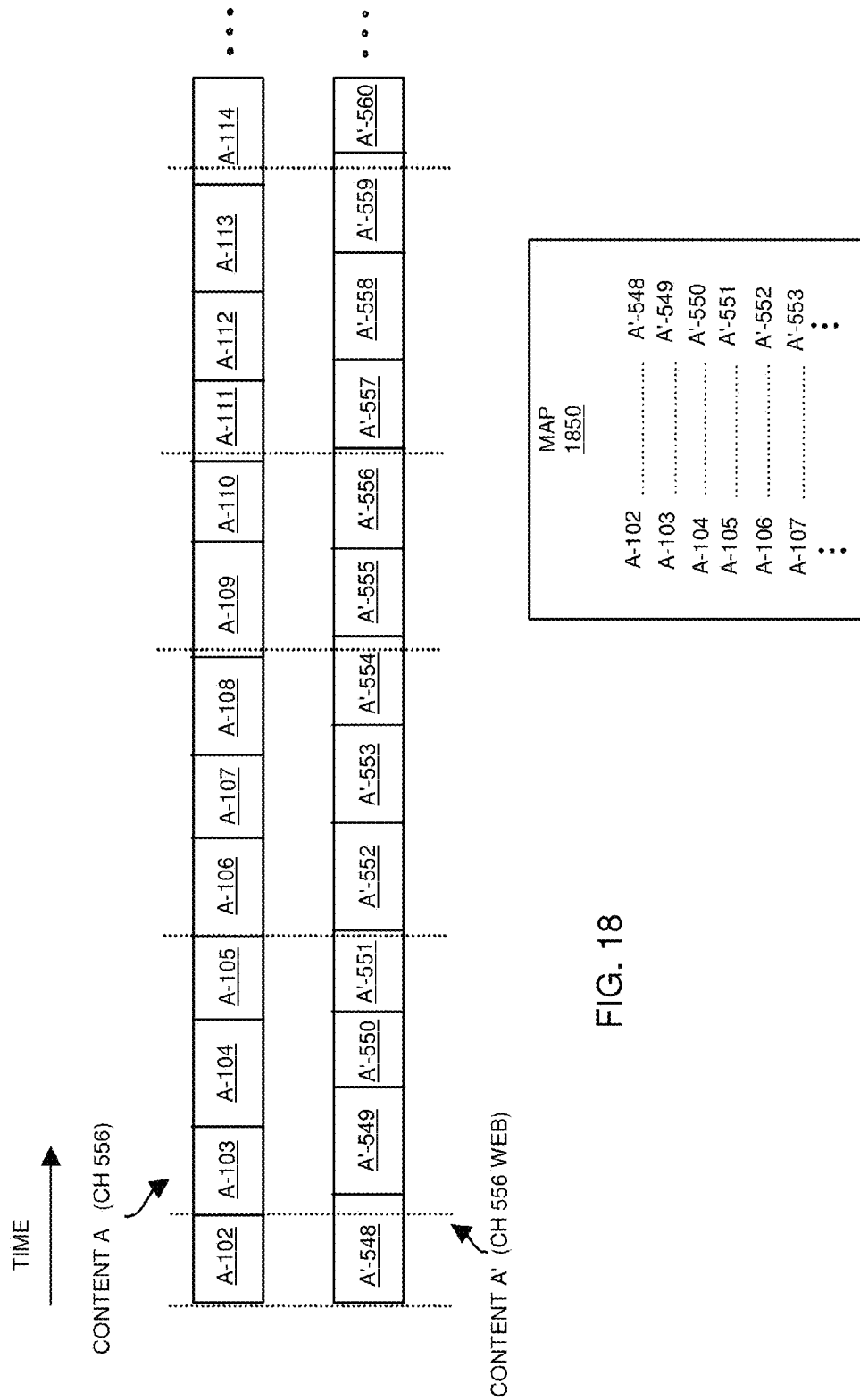


FIG. 18

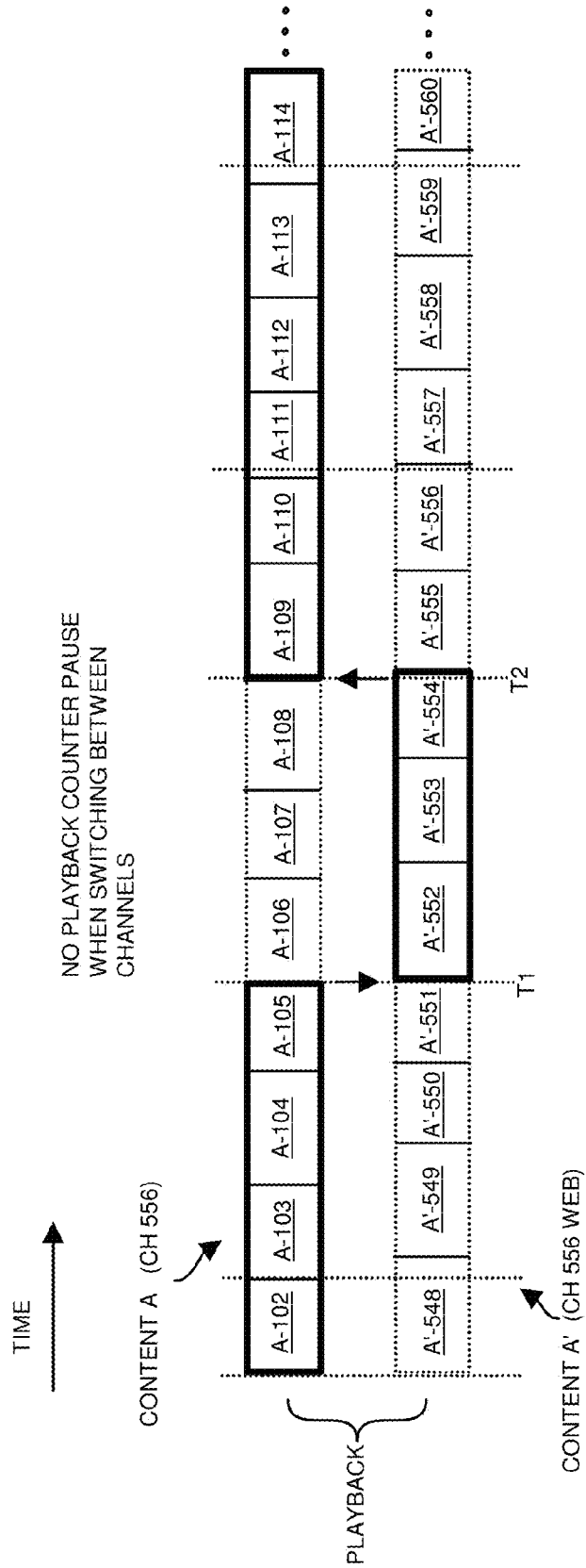


FIG. 19

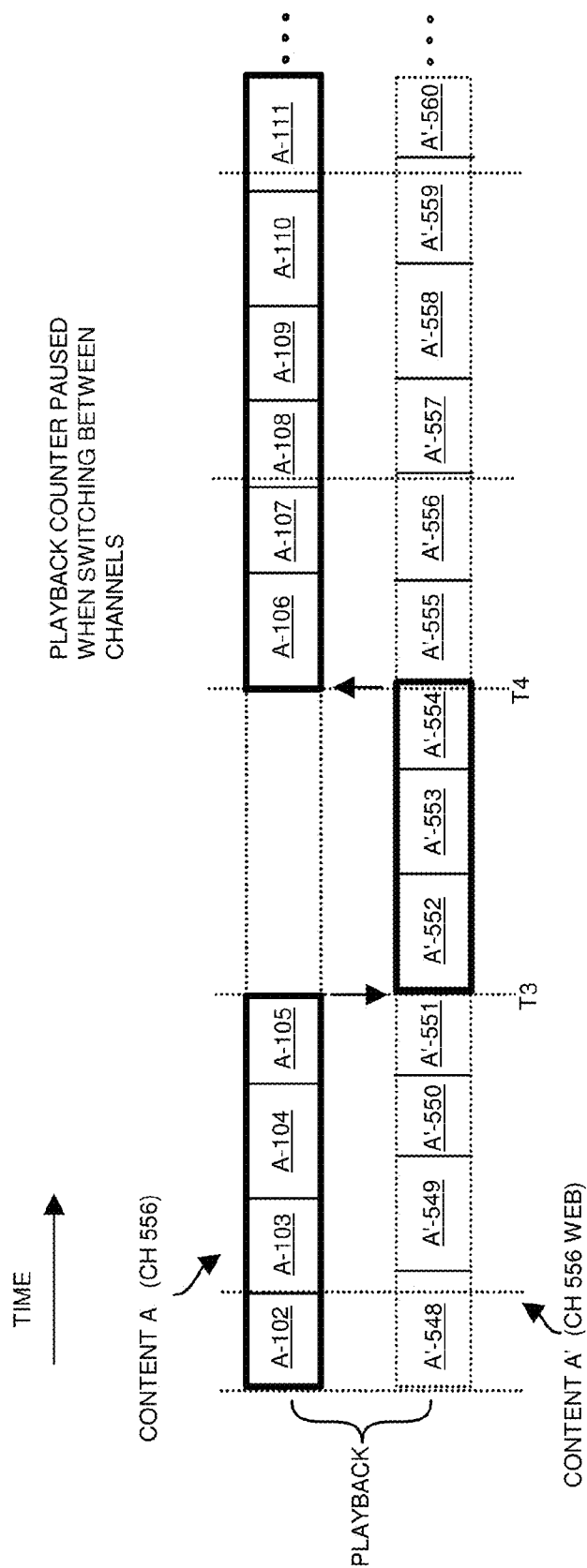


FIG. 20

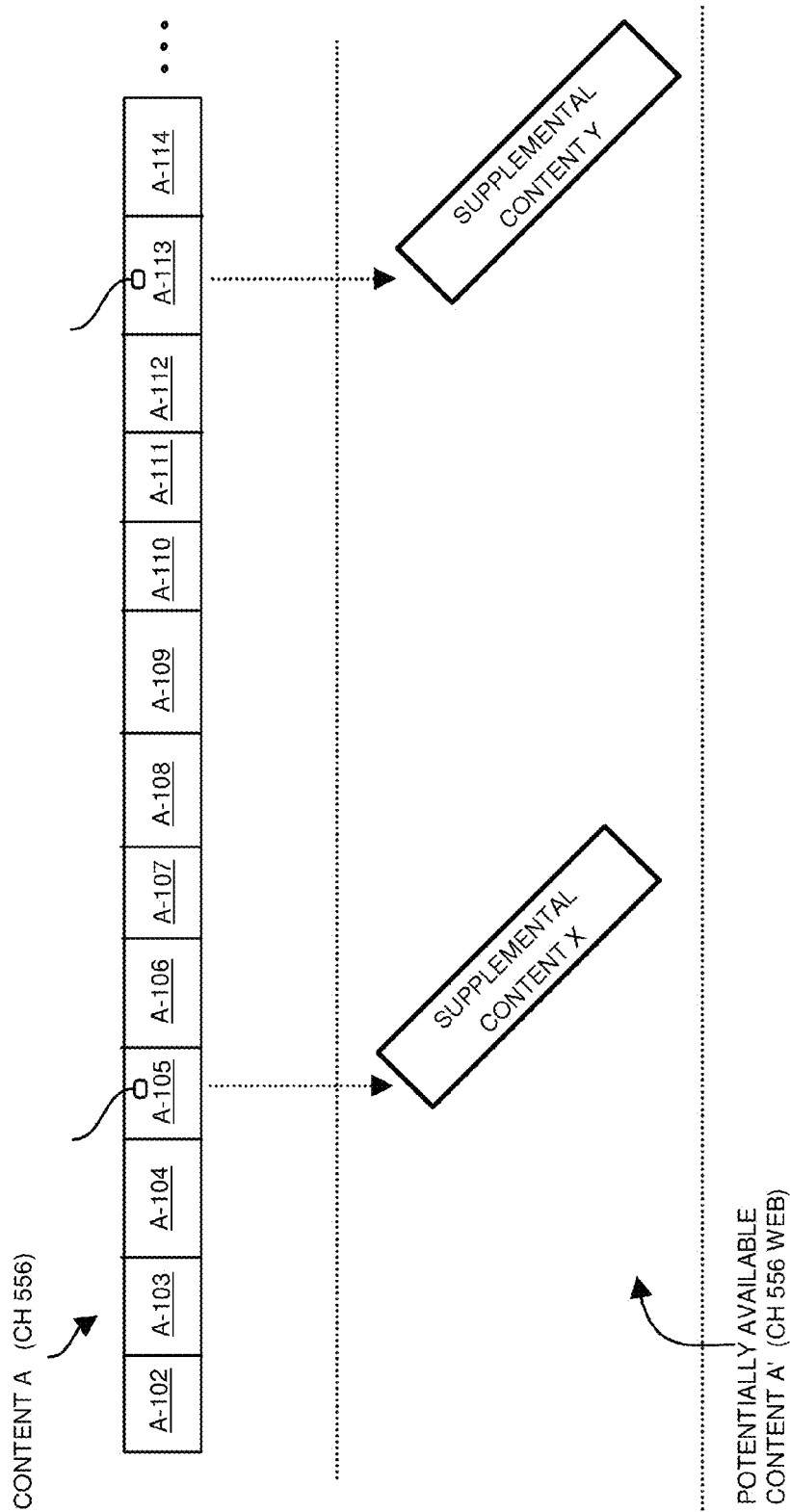
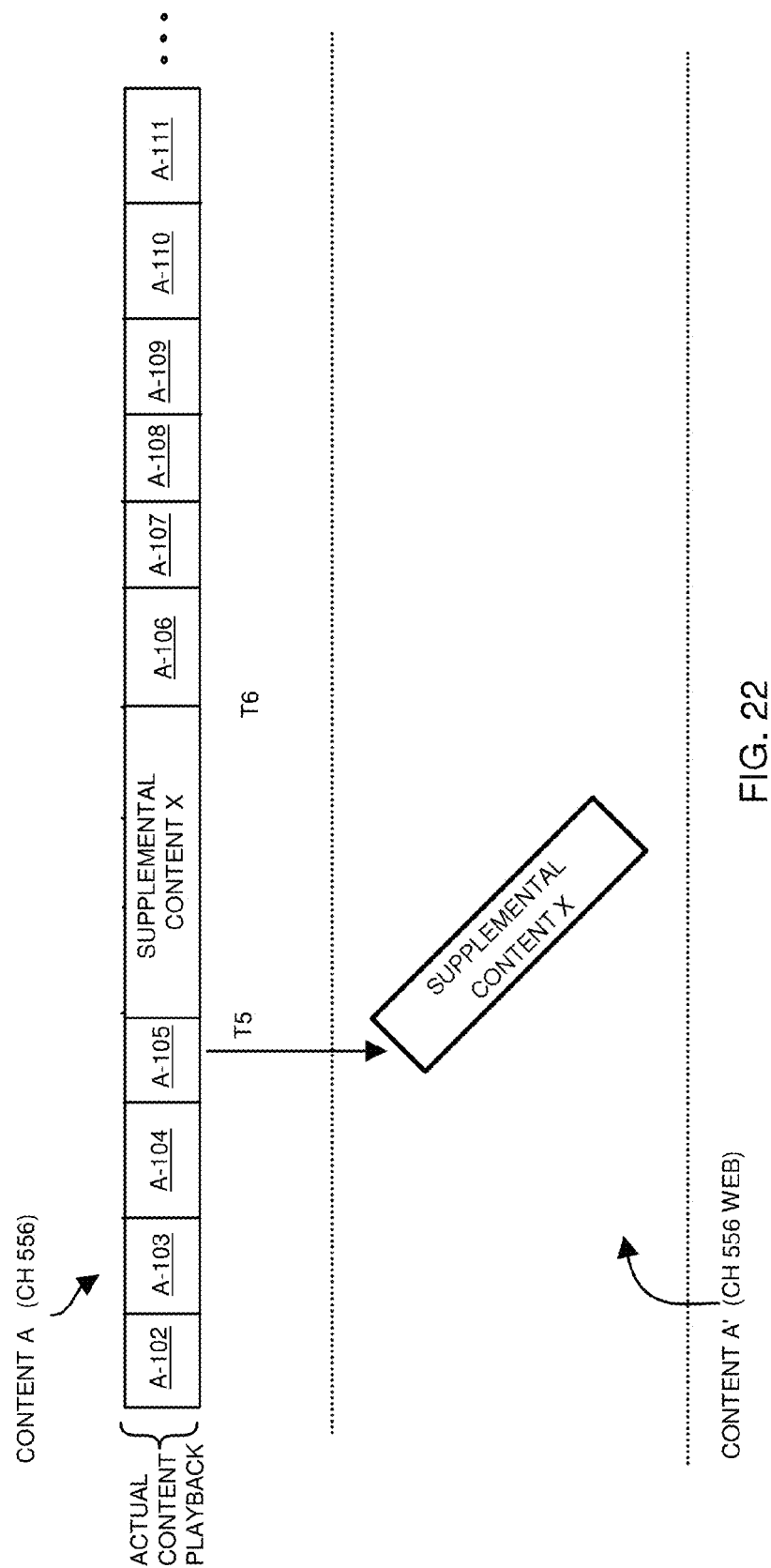
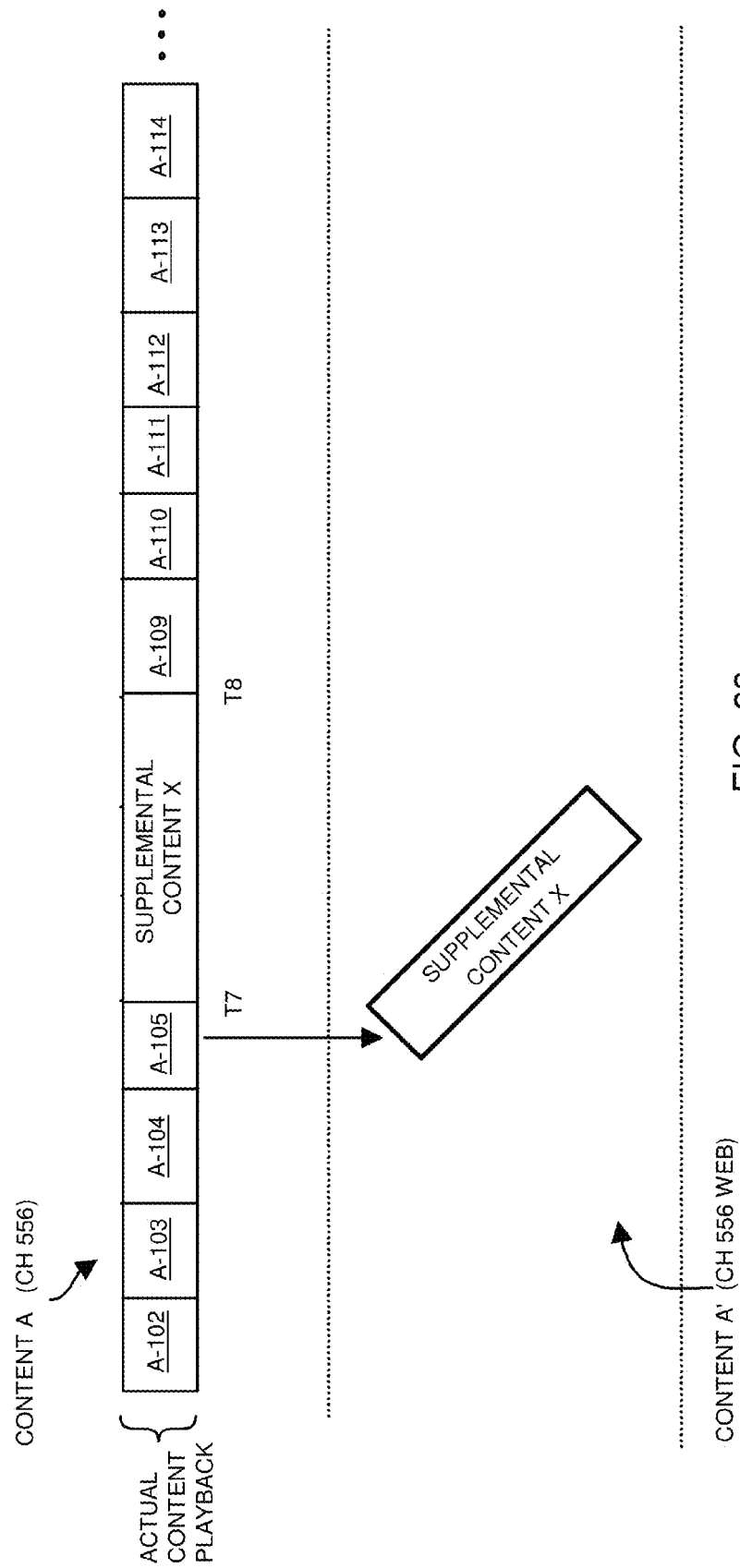


FIG. 21







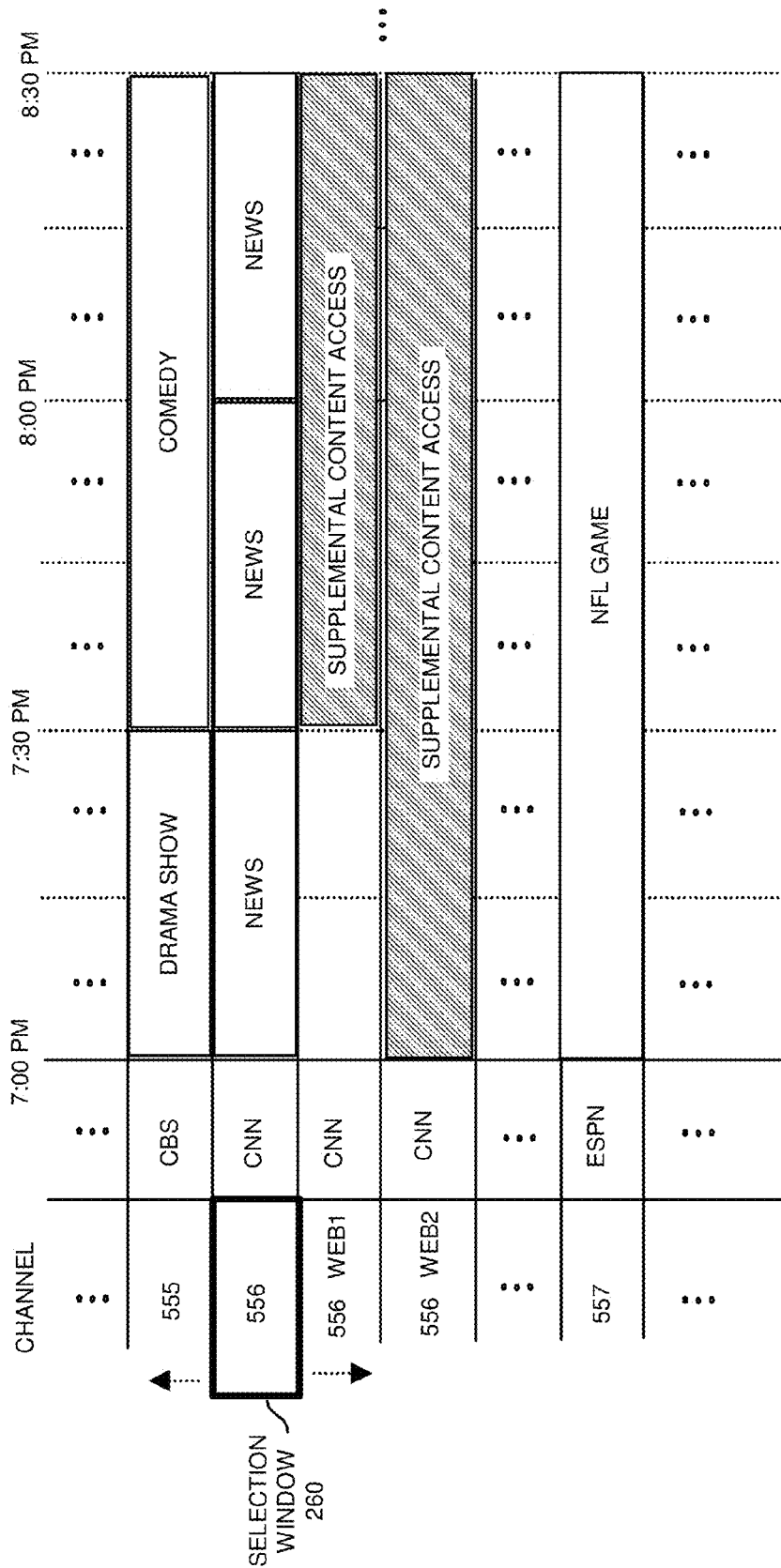


FIG. 24

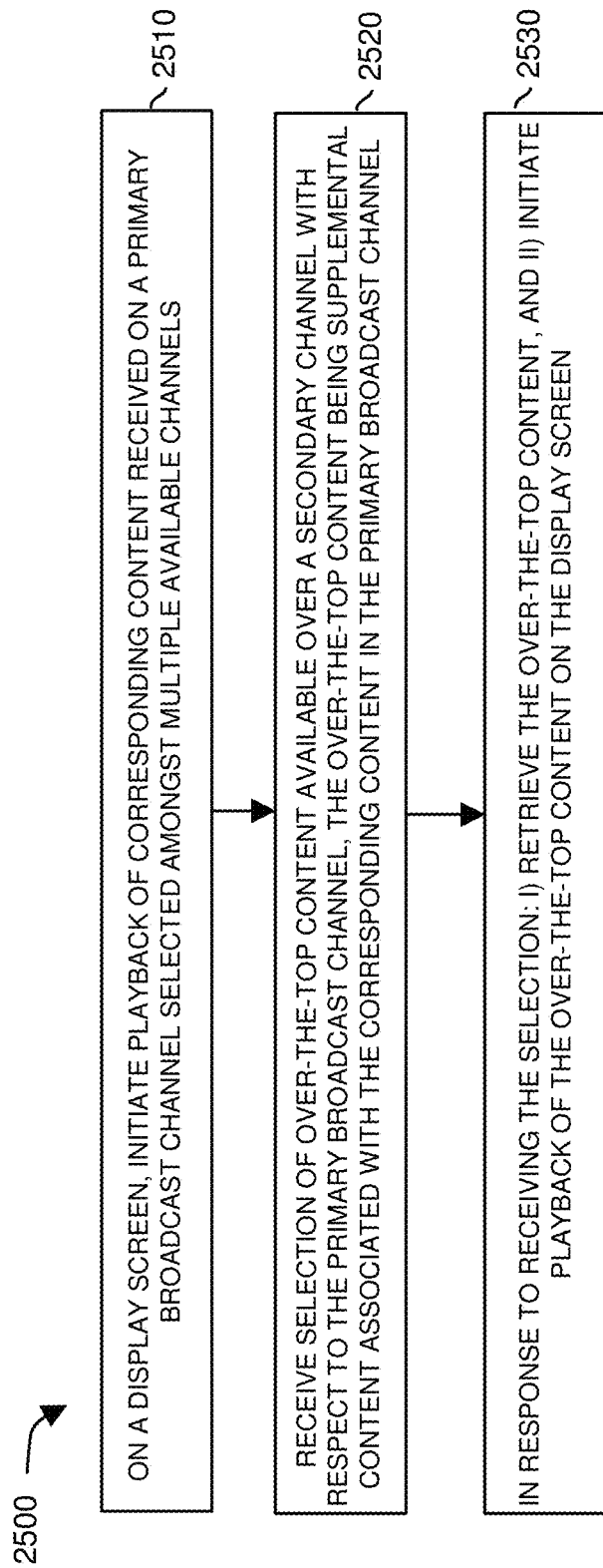


FIG. 25

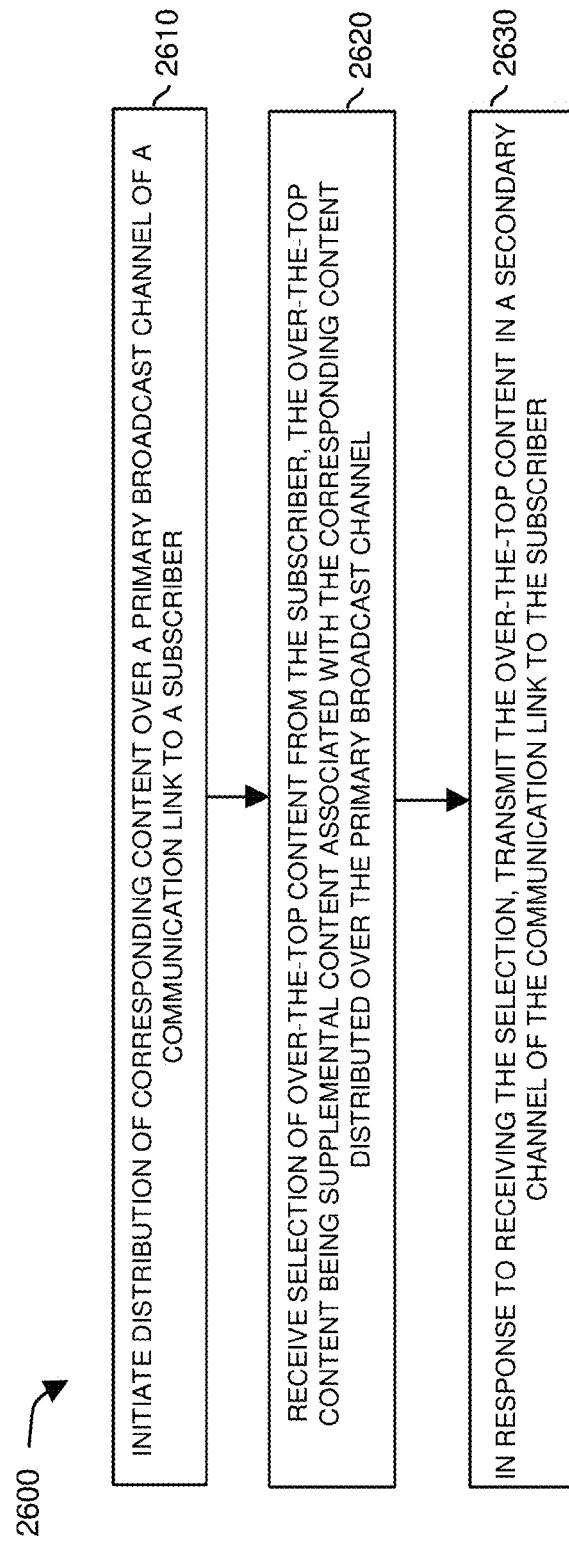


FIG. 26

## MULTI-OPTION SOURCING OF CONTENT

## BACKGROUND

In accordance with conventional television technology, cable network subscribers can tune to any of multiple broadcast and/or video on demand channels to select from multiple different television programs available on a shared communication link. For example, via input to a conventional set-top box, any of one or more subscribers can select and tune to the CNN™ (Cable News Network™) channel to view a news program; the one or more subscribers can select and tune to the ESPN™ (Entertainment and Sports Programming Network) channel to view sports events; and so on. Thus, via selection of a respective television channel, a subscriber is able to select and play back many different types of scheduled or video on demand type of content.

In certain instances, a content sponsor assigned to a respective cable network channel may wish to make additional content available to a subscriber. The content may be interactive or custom in nature and/or may not lend itself to be transmitted in a standard broadcast in a video on demand or scheduled time slot. For example, in addition to making content available on a standard television channel, the content sponsor such as CNN™ may establish one or more different websites from which additional content (e.g., statistics, stock reports, business information, etc.) is available for viewing in an interactive manner by a subscriber.

In most situations, a user plays back broadcasted or video on demand content from a content sponsor on a display screen such as a television set (e.g., a large screen television). To view custom web content available from a respective content provider, the user typically must log on to a device other than the television set such as a respective computer, open a browser on the computer, and input the appropriate network address to the browser to retrieve the additional content. In this manner, via a computer device located at a disparate location with respect to the user's television, a subscriber can retrieve so-called over-the-top content to view additional content available from, for example, a CNN™ website.

Conventional technology includes so-called widgets (i.e., applications) that enable display of retrieved content on a display screen. For example, a subscriber can initiate execution of a weather widget via a respective set-top box. The weather widget retrieves information such as current weather conditions. The subscriber can activate a widget by viewing a listing of available widgets and then selecting a particular widget amongst the list for execution. When executed, the widget enables a respective subscriber to retrieve data such as display information and initiate display of the display information on a display screen.

## BRIEF DESCRIPTION OF EMBODIMENTS

Conventional techniques of accessing content from different sources suffer from deficiencies. For example, it is often inconvenient for a user watching a television program on a respective television screen to switch over to use of a home computer in another room to view further information about the television program or selected channel from a corresponding content sponsor.

Embodiments herein are useful over conventional techniques. For example, embodiments herein enable a user such as a cable network subscriber to more easily retrieve and play back supplemental content associated with a content sponsor, television program, television channel, etc. In certain

instances, embodiments herein enable a user to have a more interactive experience with respect to viewing content available from multiple sources.

More specifically, one embodiment herein includes receiving a request to display a content guide of available content. In response to receiving the request, a processing resource initiates display of the content guide on a display screen. In the displayed content guide, the processing resource initiates display of multiple selectable content viewing options. In one embodiment, a first selectable channel viewing option of the multiple content viewing options corresponds to a television channel from which to view content originating from a content sponsor. A second channel viewing option of the multiple content viewing options corresponds to an auxiliary channel (with respect to the television channel) providing the subscriber to access available over-the-top content or other supplemental content associated with the content available on the television channel originating from the content sponsor. Accordingly, via display of a content guide displaying a novel channel lineup, a viewer can be easily notified of the availability of original content and corresponding related content available from different sources (e.g., a television channel and an auxiliary channel supporting retrieval of over-the-top content).

By further way of a non-limiting example, the channel lineup (i.e., channels of available content to a subscriber) can include a first content viewing option specifying a standard television from which to view scheduled or video on demand television programs. The second content viewing option (potentially displayed adjacent to the first content viewing option) in the channel lineup enables a respective subscriber to retrieve supplemental content such as over-the-top content associated with the television program and/or television channel. Via selection of the different content viewing options on a display screen, a viewer is able to more easily select retrieval of main content and supplemental content from multiple different sources.

Further embodiments herein can include receiving a command to view supplemental content associated with a television program while the television program is currently rendered on a display screen. In one non-limiting example embodiment, subsequent to and in response to receiving the command, a processing resource maps an identity of the television program to a corresponding network address from which the supplemental content such as web content associated with the television program is retrievable. The processing resource retrieves the supplemental content from a server resource as specified by the corresponding network address and initiates display of the supplemental content on the display screen. Accordingly, a user can initially select and view content in a scheduled time of a television channel. The user can view additional content (e.g., custom or generic over-the-top content) associated with the selected television program via input of an appropriate display command.

Note that display of related content is not limited to content associated with a respective television program. For example, embodiments herein can further include rendering content received over a cable network channel on a display screen. The cable network channel can be assigned to distribute content originating from a particular content sponsor assigned to the cable network channel. As an example, a business entity such as CNN™ may provide the content to be broadcasted on a corresponding assigned cable network channel.

Assume in one example embodiment that a user currently viewing content on the CNN™ cable network channel initiates a request to view web content associated with the CNN™ cable network channel. In one embodiment, in

response to receiving the request to access supplemental content associated with the cable network channel: a respective processing resource receiving the request maps an identity of the cable network channel currently displayed on the display screen to a network address of a server resource from which the supplemental content associated with the selected cable network channel is retrievable. The processing resource retrieves the supplemental content from the server resource as specified by the network address and initiates display of the supplemental content (such as web content) on the display screen. Accordingly, embodiments herein enable a user to easily initiate display of supplemental over-the-top content associated with a currently viewed television channel.

These and more detailed embodiments are discussed below.

Any of the resources as discussed herein can include one or more computerized devices, servers, base stations, wireless communication equipment, communication management systems, workstations, handheld or laptop computers, or the like to carry out and/or support any or all of the method operations disclosed herein. In other words, one or more computerized devices or processors can be programmed and/or configured to operate as explained herein to carry out different embodiments of the invention.

Yet other embodiments herein include software programs to perform the steps and operations summarized above and disclosed in detail below. One such embodiment comprises a computer program product including a non-transitory computer-readable storage medium (i.e., any computer readable hardware storage medium) on which software instructions are encoded for subsequent execution. The instructions, when executed in a computerized device having a processor, program and/or cause the processor to perform the operations disclosed herein. Such arrangements are typically provided as software, code, instructions, and/or other data (e.g., data structures) arranged or encoded on a non-transitory computer readable storage medium such as an optical medium (e.g., CD-ROM), floppy disk, hard disk, memory stick, one or more memory chips, etc., or other non-transitory media such as firmware or shortcode in one or more ROM, RAM, PROM, etc., or as an Application Specific Integrated Circuit (ASIC), etc. The software or firmware or other such configurations can be installed onto a computerized device to cause the computerized device to perform the techniques explained herein.

Accordingly, embodiments herein are directed to a method, system, computer program product, etc., that supports operations as discussed herein.

One embodiment includes a computer readable storage medium and/or system having instructions stored thereon. The instructions, when executed by at least one processor of a respective computer device, cause the processor or multiple processors of the system to: receive a request to display a content guide of available content; in response to receiving the request, initiate display of the content guide on a display screen; and in the displayed content guide, initiating display of multiple selectable content viewing options, a first selectable channel viewing option corresponding to a television channel from which to view content originating from (i.e., provided by) a content sponsor, a second channel viewing option corresponding to an auxiliary channel with respect to the television channel from which to access available over-the-top content associated with the content originating from the content sponsor.

Another embodiment as discussed herein includes a computer readable storage medium and/or system having instructions stored thereon. The instructions, when executed by at least one processor of a respective computer device, cause the

processor or multiple processors of the system to: while rendering a television program on a display screen, receive a command to view supplemental content associated with the rendered television program; subsequent to and in response to receiving the command, map an identity of the television program to a network address from which the supplemental content associated with the television program is retrievable; retrieve the supplemental content from a server resource as specified by the network address; and initiate display of the supplemental content on the display screen.

Another embodiment as discussed herein includes a computer readable storage medium and/or system having instructions stored thereon. The instructions, when executed by at least one processor of a respective computer device, cause the processor or multiple processors of the system to: render content received over a cable network channel on a display screen, the cable network channel allocated to distribute content originating from a content sponsor assigned to the cable network channel; in response to receiving a request to access supplemental content associated with the cable network channel: map an identity of the cable network channel currently displayed on the display screen to a network address of a server resource from which the supplemental content associated with the cable network channel is retrievable; retrieve the supplemental content from a server resource as specified by the network address; and initiate display of the supplemental content on the display screen.

The ordering of the steps above has been added for clarity sake. Note that any of the processing steps as discussed herein can be performed in any suitable order.

Other embodiments of the present disclosure include software programs and/or respective hardware to perform any of the method embodiment steps and operations summarized above and disclosed in detail below.

It is to be understood that the system, method, apparatus, instructions on computer readable storage media, etc., as discussed herein also can be embodied strictly as a software program, firmware, as a hybrid of software, hardware and/or firmware, or as hardware alone such as within a processor, or within an operating system or a within a software application.

As discussed herein, techniques herein are well suited for use in distributing main content as well as corresponding supplemental content in a cable network environments. However, it should be noted that embodiments herein are not limited to use in such applications and that the techniques discussed herein are well suited for other applications as well.

Additionally, note that although each of the different features, techniques, configurations, etc., herein may be discussed in different places of this disclosure, it is intended, where suitable, that each of the concepts can optionally be executed independently of each other or in combination with each other. Accordingly, the one or more present inventions as described herein can be embodied and viewed in many different ways.

Also, note that this preliminary discussion of embodiments herein purposefully does not specify every embodiment and/or incrementally novel aspect of the present disclosure or claimed invention(s). Instead, this brief description only presents general embodiments and corresponding points of novelty over conventional techniques. For additional details and/or possible perspectives (permutations) of the invention(s), the reader is directed to the Detailed Description section and corresponding figures of the present disclosure as further discussed below.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features, and advantages of the invention will be apparent from the following more

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particular description of preferred embodiments herein, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, with emphasis instead being placed upon illustrating the embodiments, principles, concepts, etc.

FIG. 1 is an example diagram illustrating a technique facilitating distribution of content from different sources according to embodiments herein.

FIG. 2 is an example diagram illustrating display of a content guide according to embodiments herein.

FIG. 3 is an example diagram illustrating bandwidth allocation of different types of channels in a shared communication link according to embodiments herein.

FIG. 4 is an example diagram illustrating play back of a selected channel of content according to embodiments herein.

FIG. 5 is an example diagram illustrating a map according to embodiments herein.

FIG. 6 is an example diagram illustrating display of related web content in response to receiving a request to display the related web content for the currently selected channel according to embodiments herein.

FIG. 7 is a more specific example diagram illustrating display of retrieved over-the-top content associated with a corresponding television channel according to embodiments herein.

FIG. 8 is an example diagram illustrating a content guide indicating available content and corresponding advanced interactive features for each multiple different programs according to embodiments herein.

FIG. 9 is an example diagram enabling viewer participation in a television program according to embodiments herein.

FIG. 10 is an example diagram illustrating social participation in a television program according to embodiments herein.

FIG. 11 is an example diagram illustrating a computer architecture executing one or more embodiments as discussed herein.

FIG. 12 is a flowchart illustrating an example method of providing notification of supplemental content associated with one or more television channels in a content guide according to embodiments herein.

FIG. 13 is a flowchart illustrating an example method of providing notification of the availability of supplemental content according to embodiments herein.

FIG. 14 is a flowchart illustrating an example method of providing notification of the availability of supplemental content according to embodiments herein.

FIG. 15 is an example diagram illustrating a content guide according to embodiments herein.

FIG. 16 is an example diagram illustrating an example method of providing notification of the availability of content from different types of content sources according to embodiments herein.

FIG. 17 is an example diagram illustrating distribution of content according to embodiments herein.

FIG. 18 is an example diagram illustrating synchronization of content on multiple channels according to embodiments herein.

FIG. 19 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

FIG. 20 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

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FIG. 21 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

FIG. 22 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

FIG. 23 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

FIG. 24 is an example diagram illustrating a content guide including multiple auxiliary channels on which to receive related content according to embodiments herein.

FIG. 25 is an example diagram illustrating a method of managing play back of content on multiple channels according to embodiments herein.

FIG. 26 is an example diagram illustrating a method of distributing content according to embodiments herein.

## DETAILED DESCRIPTION

Now, more specifically, FIG. 1 is an example diagram illustrating a network environment according to embodiments herein.

As shown, network environment **100** includes multiple networks including a packet-switched network **190-1**, a cable network **190-2**, shared network **190-3**, etc. Via the different types of networks **190**, respective subscribers are able to retrieve and play back different types of content such as over-the-top content, scheduled broadcast television programs, on-demand content, etc.

As its name suggests, packet-switched network **190-1** enables routing of data packets based on network address information. By way of a non-limiting example, packet-switched network **190-1** can support client server type communications. For example, a client can generate a request for content from a particular server resource using an appropriate network address of the server resource. The server resource transmits the requested content over packet-switched network **190-1** to the respective client in a subscriber domain using the network address of the client.

Cable network **190-2** supports services such as distribution of content via one or more cable television channels (e.g., QAM or quadrature amplitude modulated channels, IPTV channels, etc.) to subscribers in network environment **100**.

Shared network **190-3** supports final leg connectivity to subscribers or subscriber domains **150** and includes physical media such as one or more coaxial cables, optical fibers, twisted wire pairs, etc.

Via distribution resources **125** (e.g., equipment such as cable modem termination systems, headend equipment, hubs, optical nodes, etc.), shared communication link **191** facilitates distribution of different types of content over shared communication link **191** to a respective service group of multiple subscriber domains **150**. By way of a non-limiting example, a portion of bandwidth of shared communication link **191** can be allocated to broadcast content such as one or more television channels to subscribers in respective subscriber domains **150**. Subscribers can selectively tune to the broadcasted television channels to view respective content.

The bandwidth associated with shared communication link **191** can also support distribution of additional content such as video on demand content. To retrieve such content, a subscriber generates a request for desired content. The distribution resource **125** allocates a new channel in the shared communication link **191** and transmits the requested content over

the new channel. The requesting subscriber tunes to the newly established channel to retrieve the requested on-demand content.

As mentioned, content can be transmitted to the different subscribers in any suitable manner such as via QAM channels, IPTV channel, etc.

As mentioned, shared communication link **191** can be configured to support distribution of so-called over-the-top content. For example, a portion of bandwidth in shared communication link **191** can support data channels in accordance with DOCSIS (Data Over Cable Service Interface Specification) or any other suitable communication standard. Via the data channels, each of the subscribers can retrieve over-the-top content from respective server sources disposed in packet-switched network **190-1** such as the Internet.

An additional portion of the bandwidth of shared communication link **191** can be allocated to support miscellaneous services such as phone services. Thus, shared communication link **191** can support various services such as Internet access services, cable television services, phone services, etc.

In this example, subscriber domain **150-1** includes a content manager **140-1** such as a set-top box device, computer, etc. Content manager **140-1** can be any suitable type of play back device. Subscriber domain **150-1** can be configured to include network **174-1** such as a local area network, WiFi™ network, routers, etc., facilitating distribution of data and communications to and from subscriber domain **150-1**. Interface **112-1** connects the respective subscriber domain **150-1** to shared network **190-3**. Accordingly, the subscriber domain **150-1** is able to transmit and receive data.

User **108-1** resides in subscriber domain **150-1** and controls content manager **140-1** via input of commands from any of one or more controller devices **170** (e.g., controller device **170-1** such as a wireless set-top box remote controller, controller device **170-2** as a keyboard, etc.). The subscriber **108-1** can provide input commands to content manager **140-1** in accordance with any suitable technique.

As specified by the inputted commands, the content manager **140-1** controls play back of content received on any of one or more channels of the shared communication link **191**.

Assume in this example that the subscriber **108-1** inputs a respective command to view content guide **250-1** on display screen **130-1**. In response to the command, the content manager **140-1** initiates retrieval of display data associated with the content guide and displays content guide **250-1** on display screen **130-1**.

A non-limiting example of content guide **250-1** is shown in FIG. 2. In this example embodiment, the content guide **250-1** displayed on display screen **130-1** includes a channel lineup of multiple selectable content viewing options.

Certain viewing options in the displayed content guide **250-1** correspond to available television channels that can be selected by the subscriber **108-1** for viewing. For example, assume that the current time is 7:01 pm. Via selection window **260**, the subscriber can select channel 555 to view a drama show on television channel 555 (e.g., CBS™); the user can select channel 556 to view NEWS on television channel 556 (e.g., CNN™); the user can select channel 557 to view NFL GAME on television channel 557 (e.g., ESPN™); etc.

By way of a non-limiting example, the selection window **260** can be navigated up, down, left, right, etc., via respective arrow buttons on the control device **170-1**. After highlighting a respective entry in content guide **250-1**, the subscriber can press an OK button or selection button on the controller device **170-1** to confirm a selection.

Accordingly, embodiments herein can include: initiating display of a first channel viewing option or notification speci-

fying playable content such as NEWS in scheduled timeslot 7:00-7:30 pm. of channel 556 as well as initiating display of a second channel viewing option (e.g., channel 556 WEB) specifying availability of the over-the-top content **114** via an auxiliary channel (e.g., 556 WEB) with respect to standard channel 556.

To select a respective channel in content guide **250-1**, the respective subscriber **108-1** can navigate selection window **260** about displayed content guide **250-1**. Subsequent to receiving selection of a respective channel in content guide **250-1**, the content manager **140-1** tunes to the appropriate selected channel **122** (such as channel 556 in this instance) and plays back corresponding broadcasted content received on channel 556. Thus, via selection form content guide **250-1**, the subscriber is able to select amongst multiple channels for viewing.

In this example embodiment, note that certain content sponsors (i.e., content providers) such as content sponsor CNN, content sponsor ESPN, etc., may produce additional content that is available over the Internet. Content guide **250-1** includes content viewing option 556 WEB enabling a respective user to view additional content associated with the CNN channel; content guide **250-1** includes content viewing option 557 WEB enabling a respective user to view additional content associated with the ESPN channel; and so on.

As a more specific example, each content sponsor may have a respective home page. Via selection of channel 556 WEB via selection window **260**, the subscriber **108-1** can view a home page or any other suitable content associated with content sponsor CNN. Via selection of channel 557 WEB via selection window, the subscriber **108-1** can view a home page or any other suitable content associated with content sponsor ESPN.

The juxtaposition of displaying a respective television channel viewing option and a web channel viewing option adjacent or near each other in a content guide **250-1** is useful. For example, a subscriber may be interested in viewing content from a particular content sponsor such as CNN. Via the content guide **250-1**, and display of multiple selectable viewing options (e.g., a standard television channel viewing option and related web content channel viewing option), the subscriber can easily, selectably, and efficiently view content from different sources for each of the content sponsors. Thus, in contrast to conventional techniques, a user can view content guide **250-1** and identify more options from the same content sponsor in a channel lineup.

Referring again to FIG. 1, display screen **130-1** initiates display of the content guide **250-1**. Subscriber domain **150-1** receives one or more television channels of available content over termination branch **191-1** of shared communication link **191**. By way of a non-limiting example, branch **191-1** is a final portion of a communication link connecting subscriber domain **150-1** to shared communication link **191**.

Assume in this example that content sponsor **105-1** represents content sponsor CNN™ and that content **113-2** represents the NEWS program available in time slot 7:00-7:30 pm of channel 556. By way of a non-limiting example, the content sponsor **105** provides content **113-2** to the cable network service provider. The cable network service provider makes the content **113-2** available to subscribers.

As previously discussed, when the subscriber **108-1** (i.e., user) selects channel 556 for viewing, the content manager **140-1** tunes to channel 556, decodes the corresponding content stream, and plays back a rendition of the respective content on display screen **130-1** for viewing by the respective

subscriber **108-1**. Again, channel 556 can be any suitable type of channel such as a QAM channel, IPTV channel, video on demand channel, etc.

Further, as previously discussed, in certain instances, the subscriber **108-1** may wish to view alternative content **114** (i.e., supplemental content) such as over-the-top content, web content, etc., provided by or made available by the content sponsor **105** (e.g., CNN) or any other suitable resource. In such an instance, in response to receiving selection of channel 556 WEB, the content manager **140-1** initiates communications over a respective data channel such as data channel **123-1** (e.g., an IP channel, Internet channel, etc.) in shared communication link **191**.

By way of a non-limiting example, to retrieve content **114** such as home page associated with the content sponsor CNN™, the content manager **140-1** produces a request message including a network address of the server resource **110-2** from which the content **114** associated with content sponsor **105-1** is retrievable. The content manager **140-1** communicates the request message (e.g., one or more IP data packets) through the data channel to server resource **110-2**. The content manager **140-1** decodes and renders the content **114** (e.g., streaming video, home page, etc.) received from server resource **110-2** on display screen **130-1** for viewing by the respective subscriber **130-1**.

Accordingly, network environment **100** and corresponding infrastructure enables a respective content sponsor to distribute content to a respective subscriber from a number of different sources in network environment **100**. Additional details are discussed below.

FIG. 3 is an example diagram illustrating bandwidth allocation according to embodiments herein.

As previously discussed, the bandwidth of the shared communication link **191** can be allocated to include one or more channels (e.g., scheduled television channels, video on demand channels, etc.). In this example embodiment, bandwidth of shared communication link **191** can include channels . . . , 556, 557, 558, 559, . . . .

Assume that channel 556 includes content **113-2** from content sponsor CNN; channel 557 includes content from content sponsor ESPN; and so on.

Shared communication link **191** can also include one or more data channels **123-1**, **123-2**, **123-3**, **123-4**, etc., to carry over-the-top such as IP (Internet Protocol) data traffic. Subscribers in network environment **100** are coupled to shared communication link **191** can share use of the data channels to retrieve web content.

In this example embodiment, the content manager **140-1** includes a tuner resource **320-1**. In a manner as previously discussed, the user can select a standard television channel from which to view a broadcast of streaming video content. In response to receiving selection of channel 556, the content manager **140-1** sets tuner resource **320-2** to tune to channel 556. Display manager **350-1** decodes the received data on channel 556 and renders play back of the corresponding content **113-2** on display screen **130-1**.

Via selection window **260**, the subscriber **108-1** may also select 556 WEB. In accordance with one embodiment, responsive to receiving selection of this channel viewing option (i.e., channel 556 WEB), the content manager **140-1** retrieves an appropriate network address specifying the server resource **110-2** from which the content **114** (such as a home page or other type of content associated with sponsor CNN) can be retrieved.

The network application **340-1** (such as a web browser or other suitable type of resource) utilizes the network address of content sponsor CNN to communicate with the server

resource **110-2** over an auxiliary channel (e.g., channel 556 WEB or channel **123-1**) with respect to main channel 556.

Note that in one embodiment, the network application **340-1** such as a browser can be opened or executed well before receiving a request to access corresponding web content.

The network application **340-1** transmits the content request message over the auxiliary channel to retrieve display information such as content **114** generated by the content sponsor **105** or other suitable resource. The network application **340-1** receives the display information over the auxiliary channel from the server resource **110-2**. The display manager **350-1** decodes and renders the display information (e.g., content **114**) on the display screen **130-1**.

In a similar manner, each of the subscribers in respective subscriber domains **150** of network environment **100** can retrieve and play back content from multiple different sources for a particular content provider (e.g., content sponsor).

As previously mentioned, network application **340-1** can be a browser application supporting retrieval of over-the-top content. The network application **340-1** can retrieve and transmit content (e.g., documents, web pages, video data, audio data, images, etc.) in accordance with a communication protocol such as Hypertext Transfer Protocol (HTTP) HTTP or any other suitable communication protocol. As will be further discussed below, additional displayed viewing options such as hyperlinks present in the information displayed on display screen **130-1** enable the subscriber to navigate to other websites, retrieve different types of content, etc.

Accordingly, a respective subscriber can select a standard television channel to view standard broadcast content associated with a content sponsor. The subscriber can select an auxiliary channel to access supplemental content made available by a respective content sponsor.

In one embodiment, the over-the-top content available in the auxiliary channel such as 556 WEB is tied to a schedule. For example, referring again to FIG. 2, a user has an option of selecting a respective channel to view linear content currently broadcasted on channel 556. In such an instance, as discussed herein, user views the currently broadcasted content when tuning to a respective channel.

The content sponsor CNN or other suitable resource can produce additional linear content (such as supplemental content) that is available for viewing as over-the-top content in channel 556 WEB. In such an instance, a respective server resource streaming the over-the-top content on channel 556 WEB streams content to a respective user **108-1** depending on a current time of day in a similar manner that the broadcasted content in channel 556 would be transmitted. Accordingly, the user **108-1** can select viewing of content (such as a one or more video on demand assets) on channel 556 WEB, which may appear to the user **108-1** as broadcasted content, even though the data stream is over-the-top content.

In accordance with further embodiments, if desired, the content on broadcast channel 556 and over-the-top content channel 556 WEB can be synchronized with each other to provide a selectable viewing experience. For example, the content available on the over-the-top content channel 556 WEB can include images of the same or substantially the matter as shown in channel 556, but at one or more different camera perspectives.

Synchronization of playing back content on a primary channel (such as channel 556) and auxiliary channel (such as 556 WEB) can be achieved in any suitable manner. For example, in one embodiment, a play back device operated by the user can be configured to store the content broadcasted over channel 556 as it is received. The user can change the



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current play back pointer in the data stream to an earlier time and play back previously stored content. The user can change the play back pointer to a later point in time as well to view currently received content.

In one embodiment, when switching between viewing content on channel 556 and channel 556 WEB, the play back device operated by the user can be configured to keep track of the current play back location in the primary channel. When switching over to viewing content in the secondary channel, the play back device can be configured to send time information specifying the current play back location to a respective server resource streaming content associated with channel 556 WEB. In this manner, if the web connection is sufficiently fast, the user 108-1 is able to content associated with the content transmitted in the primary broadcast channel.

In accordance with another embodiment, if desired, both the channel 556 and channel 556 WEB can be configured to transmit related content such as different images of a same subject matter. The user can toggle between play back of the different channels to view the different images.

One embodiment herein includes storing a combination of the content received on selected channel 556 as well as corresponding channel 556 WEB in a corresponding storage device accessible to the viewer.

The content in each of the different channels can include respective time stamp information or timing information. The timing information specifies synchronization of stored content from the primary broadcast channel to stored content in the secondary channel. Upon play back of the content associated with channel 556, the current location of the play back pointer in the primary channel content can be used to identify an appropriate location in the supplemental content received on the secondary channel to play back on the display screen 130-1 if the user wishes to view the alternative content stored on channel 556 WEB.

As mentioned, the supplemental content received in the secondary can be asynchronous in which the content in each channel has little or no relation to each other.

Additional or alternative embodiments can include enabling a respective user to start play back of supplemental content at a beginning of a respective data stream upon request of a respective user as opposed to identifying a corresponding intermediate location in a data stream to play back based on the previous location of playing back content received on the primary broadcast channel.

Note that additional details of content management are discussed below in FIGS. 17-27 as well as corresponding text.

FIG. 4 is an example diagram illustrating transition of displaying content received on a television channel to an auxiliary channel according to embodiments herein.

In a manner as previously discussed, assume that the subscriber initially produces control input 405 indicating to tune to channel 556 and render corresponding content 113-2 provided by content sponsor 105 on display screen 130-1.

Assume that during play back of respective content 113-2 received on channel 556, the subscriber 108-1 would like to switchover to viewing and/or accessing supplemental content such as web content 114 associated with channel 556. Assume in this example that the subscriber 108-1 provides control input 405 such as by pressing an appropriate button 425 on controller device 170-1.

While rendering content 113-2 from channel 556, assume that the subscriber 108-1 presses button 425. In response to receiving the control input 405 as a result of the button 425 being pressed, the content manager 140-1 utilizes map 465 to map the currently viewed channel (i.e., channel 556 associated with content sponsor CNN) to a corresponding network

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address or URL (Uniform Resource Locator) to retrieve the corresponding supplemental content 114 for play back on display screen 130-1.

FIG. 5 is an example diagram illustrating a map 465 according to embodiments herein. In one embodiment, the content manager 140-1 keeps track of the currently selected channel (i.e., channel 556 in this instance). Via map 465, the network application 340-1 determines that supplemental web content (such as content 114) associated with channel 556 and/or content sponsor CNN can be retrieved from a URL such as CNN.COM (or corresponding unique IP network address #1).

The network application 340-1 uses the identified network address and/or URL (e.g., network application #1) to obtain the supplemental content 114 from server resource 110-2.

As further shown in FIG. 6, in response to receiving the command (such as depressing of button 425) to retrieve and display content 114 associated with channel 556 WEB, the display manager 350-1 switches into a mode of displaying a rendition of retrieved supplemental content 114 (as retrieved over auxiliary channel 556 WEB by network application 340-1) in display region 620 on display screen 130-1.

Note that FIG. 6 illustrates an example of a picture-in-picture mode in which the display manager 350-1 displays a rendition of the supplemental content 114 received from channel 556 WEB in a portion of the display screen as an overlay on top of a rendition of content 113-2 from channel 556 as a background on display screen 130-1.

As an alternative to displaying a picture-in-picture mode as in FIG. 6, the display manager 350-1 can be configured to discontinue playing back content 113-2 and display a rendition of supplemental content 114 over the entire field of pixels in the display screen 130-1.

By further way of a non-limiting example, whether in a picture-in-picture mode or an alternating display mode (in which either a rendition of content from channel 556 is displayed or content from channel 556 WEB is displayed), if supplemental content is associated with a respective viewed channel, note that the button 425 of controller device 170-1 can be used to toggle between playing back streaming content 113-2 received on channel 556 and playing back corresponding supplemental content associated with the channel.

More specifically, while displaying a rendition of content 113-2 on display screen 130-1 from channel 556, selection of the button 425 causes the display manager 350-1 to switch over to (alternatively or additionally) displaying a rendition of supplemental content 114 (such as a home page or other suitable content) on display screen 130-1. While displaying a rendition of content 114 on display screen 130-1 from an over-the-top channel such as auxiliary channel 556 WEB, selection of the button 425 can cause the display manager 350-1 to switch over to displaying a rendition of content 113-2 on display screen 130-1 again.

Accordingly, in one embodiment, a user such as subscriber 108-1 can easily toggle between modes of playing back content from different sources for a particular content provider merely by repeatedly pressing the button 425.

In yet further embodiments, the content 112-2 received on the main television channel (e.g., channel 556) can be recorded in a digital video recorder. As mentioned, the subscriber 108-1 can temporarily switchover to viewing the available supplemental web content received over the auxiliary channel (e.g., channel 556 WEB). In response to detecting that a user switches back to viewing the main television channel again after temporarily viewing the supplemental content, the display manager 340-1 can initiate play back of stored broadcast content so that the subscriber 108-1 is able to

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view an entirety of the content **112-2**, as opposed to skipping play back of parts of the content **112-2** due to times when the user happened to view content received of the auxiliary channel 556 WEB.

Thus, certain embodiments herein can include storing a program of currently viewed content **112-2** as received on channel 556; in response to detecting switchover to viewing content on channel 556 WEB, storing a pointer in a respective video stream of the stored content, the pointer specifying a play back time at which the user switches over to the auxiliary channel 556 WEB; and upon switchover back to viewing the main television channel or stored content **112-2**, playing back the stored content starting at the time as specified by the pointer. As mentioned, the subscriber is able to view a television program in its entirety even though the subscriber happens to at least temporarily switch over to viewing supplemental content associated with a currently viewed television program or channel.

FIG. 7 is an example diagram illustrating a rendering of over-the-top content associated with a television channel according to embodiments herein.

As previously discussed, the user can initiate display of content associated with channel 556 WEB on display screen **130-1**. In this example embodiment, assume that the content manager **140-1** receives a request to display content associated with channel 556 WEB. In such an instance, the display manager **340-1** initiates display of content **114** in display region **620** as shown.

The rendering of supplemental content (associated with a television program or content provider) in display region **620** can include displaying a menu of further selectable content viewing options **720** such as content viewing option **720-1**, content viewing option **720-2**, content viewing option **720-3**, and so on. Each of the content viewing options **720** can correspond to further retrievable supplemental over-the-top content accessible by the subscriber **108-1**.

By way of a non-limiting example, the rendition of content in display region **620** may be a web home page of the CNN content sponsor. The subscriber **108-1** can initiate selection of content viewing option **720-1** to retrieve further display information over the auxiliary channel 556 WEB (e.g., a data channel) for viewing in display region **620** on display screen **130-1**; the subscriber **108-1** can initiate selection of content viewing option **720-2** to retrieve further display information over the auxiliary channel 556 WEB (e.g., a data channel) for viewing in display region **620** on display screen **130-1**; and so on.

Accordingly, embodiments herein can include initiating display of a set of selectable content viewing options **720** on the display screen **130-1** in which each of the content viewing options **720** specifies different content available for selection and retrieval over the auxiliary channel; and in response to selection of a given content viewing option from the set of displayed content viewing options **720**, initiating a communication over the auxiliary channel to a respective server resource to retrieve content as specified by the given content viewing option.

FIG. 8 is an example diagram illustrating an example of another version of a content guide according to embodiments herein.

In this example embodiment as shown, the content guide **250-2** indicates availability of corresponding web content for each of multiple different television programs as opposed to merely that web content such as a respective home page or other supplemental content is available from a particular content sponsor.

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For example, as shown in FIG. 8, content guide **250-2** indicates that television program “GERALDO SHOW LIVE” supports interactive television.

In one embodiment, content guide **250-2** indicates that supplemental content is available from channel 567 WEB for television program “GERALDO SHOW LIVE” in timeslot between 7:00 and 8:00 pm; content guide **250-2** indicates that supplemental content is available from channel 556 WEB for television program “LIVE INTERVIEW WITH TED TURNER” in timeslot between 8:00 and 9:00 pm; content guide **250-2** indicates that supplemental content is available from channel 567 WEB for television program “AMERICAN IDOL” in timeslot between 9:00 and 10:00 pm; and so on.

A corresponding unique network address from which to retrieve web content for a television program can be assigned to each of the programs. For example, a first set of one or more unique network addresses from which to retrieve supplemental content associated with the “GERALDO SHOW LIVE” can be assigned to the “GERALDO SHOW LIVE” aired in channel 567 during timeslot 7:00 to 8:00 pm.

In a manner as previously discussed, a respective subscriber can tune to view a respective television program such as “GERALDO SHOW LIVE.” Note that the network application **340-1** can be executing well before a time of actually initiating an access of web content such as at or around a time of powering up the content manager **140-1** for use. Early execution of the network application **340-1** can reduce delays of retrieving corresponding supplemental content when so requested by a subscriber.

Note that display of notifications in the content guide is one way that a respective subscriber can be notified that supplemental content is available for a respective television program. However, in one embodiment, the subscriber **108-1** may not need to view the content guide **250-2** to learn that corresponding web content associated with a television program is available for retrieval.

For example, the network application **340-1** in content manager **140-1** can be configured to monitor a current viewed channel to which tuner resource **320-1** is tuned. The content manager **140-1** can be configured to check whether a particular selected channel being played back on display screen **130-1** has corresponding web content available for viewing. If so, the display manager **350-1** provides a notification to a subscriber by initiating display of a visual notification such as a symbol on the display screen **130-1** to notify the subscriber **108-1** that web content is available for the currently selected television program.

Assume in this example that the subscriber **108-1** selects the television program “GERALDO SHOW LIVE” on channel 567 for display on display screen **130-1**. In a manner as previously discussed, the tuner **320-1** tunes to channel 567 and renders the selected television program on display screen **130-1**. While the “GERALDO SHOW LIVE” is played back by content manager **140-1**, the display manager **350-1** can be configured to initiate display of a symbol in a small portion of the display screen **130-1** to notify the subscriber **108-1** that web content associated with the displayed television program is available.

Assume further in this example that the subscriber **108-1** provides input such as pressing button **425** to access the web content associated with the “GERALDO SHOW LIVE.” In response to receiving a command such as a subscriber **108-1** pressing button **425** to access web content associated with the “GERALDO SHOW LIVE,” the network application **340-1** accesses a respective map to identify a corresponding network address from which web content associated with the currently displayed channel can be retrieved. Via communi-

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cations with respect to a server resource as specified by the network address, the network application **340-1** retrieves the supplemental content such as web content associated with the “GERALDO SHOW LIVE” and initiates display of the corresponding supplemental content on the display screen **130-1**.

Accordingly, a subscriber **108-1** can initially select and view content in a scheduled time of a television channel. The user can view additional content (e.g., custom or generic over-the-top content) associated with the selected television program via input of an appropriate display command such as pressing button **425** on control device **170-1**.

The communication channel (e.g., a client server channel) used by the network application **340-1** to retrieve the supplemental content can be used for a number of purposes such as interactive television. For example, the retrieved web content can enable a respective user to participate in a poll associated with the corresponding main television program.

As previously discussed, the supplemental content facilitating interactive television can be displayed on display screen **130-1** as a picture-in-picture. In one embodiment, via input to a poll received over channel 567 WEB and presented picture-in-picture window on the display screen **130-1**, the subscriber **108-1** can provide feedback indicating whether the subscriber believes that a male guest currently interviewed on the “GERALDO SHOW LIVE” (as captured in video received and played back from the main channel 567) is telling the truth or not about a particular subject matter discussed several minutes earlier on the show played back on the display screen **130-1** (e.g., from channel 567).

The content provider of the “GERALDO SHOW LIVE” can tally results of the poll from multiple different subscribers (as received in a similar manner via interactive television), and posts results later in the television show broadcasted on channel 567. For example, via collection of information from different subscribers via the auxiliary channel providing web access, a data collection manager in the corresponding server resource associated with channel 567 WEB can determine that 75% of the audio viewing the “GERALDO SHOW LIVE” and taking the poll thinks that the male guest is lying about a subject such as cheating on his girlfriend. The corresponding content sponsor can play back the results of the poll on the show after tallying results.

Accordingly, embodiments herein can include receiving feedback from multiple subscribers with respect to television program; and producing a portion of the television program viewed by the subscriber to include the feedback.

Thus, a respective network application **340-1** can support two-way communications amendment interactive television. For example, display information can be retrieved from a particular web site and displayed on display screen **130-1** as supplemental content. In a reverse direction, the subscriber **108-1** can input data to the respective website to participate in the television program.

In accordance with yet further embodiments, the supplemental web content associated with a respective television channel can vary depending on which particular portion of the television program is being broadcasted to subscribers. For example, via the network application **340-1**, a respective subscriber may be able to use the network application **340-1** to participate in a poll during first portion of a broadcast. During another portion of the broadcast, via communications over a respective auxiliary WEB channel for a program, the respective subscriber may be able to participate in the show as if they were present in the audience; and so on.

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FIG. 9 is an example diagram enabling further viewer participation in a television program according to embodiments herein.

As shown, the subscriber domain **150-1** can be equipped with a respective camera resource **175-1** (e.g., an audio and image capturing device) to monitor the subscriber **108-1**. In one embodiment, network application **340-1** transmits the captured images/audio to server resource **110-2** that stores the content. The corresponding content sponsor can receive the captured images/audio and initiate play back of such content in the corresponding television program. Accordingly, the host of “GERALDO SHOW LIVE” can interview a subscriber **108-1** at a remote location (such as in their home) and display the results of the home interview later in the corresponding broadcasted television program. Thus, subscribers in their respective homes can participate in a respective television show even though they are not physically present in an audio.

FIG. 10 is an example diagram illustrating the ability for subscribers to communicate with other subscribers according to embodiments herein.

As shown, each of the multiple subscriber domains **150** can be equipped with a respective camera resource. For example, subscriber domain **150-1** can be equipped with camera resource **175-1** to capture audio/images in subscriber domain **150-1**; subscriber domain **150-2** can be equipped with camera resource **175-2** to capture audio/images in subscriber domain **150-2**; and so on.

Each content manager **140** in a subscriber domain can be configured to monitor play back of particular content selected for viewing by a respective subscriber. When the subscriber tunes to a particular predetermined channel or television program, the network application in each content manager can be configured to access management resource **110-6** to determine whether the subscriber’s one or more friends also happen to be watching the same television show. Management resource **110-6** can be configured to keep track of which subscribers in network environment **100** are open to receiving communications from each other. Assuming that subscriber **108-1** and subscriber **108-2** are friends with each other, in one embodiment, the management resource **110-6** communicates a message to the parties to indicate that they can communicate with each other via a video session.

More specifically, assume that subscriber **108-1** and subscriber **108-2** are friends that enjoy watching football. Assume further that management resource **110-6** keep track of the relationship between subscriber **108-1** and subscriber **108-2**. Each content manager **140** can be configured to monitor when a respective subscriber watches a football game.

By way of a non-limiting example, in response to detecting that subscriber **108-1** has tuned to channel 557 to watch the football game starting at 7:00 pm (FIG. 2), the network application **340-1** in content manager **140-1** contacts management server **110-6** to indicate that subscriber **108-1** is currently watching the football game (or particular channel). In a similar manner, each of multiple subscribers can notify the management resource **110-6** of the corresponding channel they are watching. In this example, assume that subscriber **108-2** has also tuned to view the football game on channel 557.

In response to detecting that subscriber **108-1** has tuned to channel 557 to watch the football game starting at 7:00 pm (FIG. 2) as well, the network application **340-1** in content manager **140-1** contacts management server **110-6** check if any friends of subscriber **108-2** happen to be watching the same football game (or channel). If so, the management resource **110-6** can communicate through the respective network applications to notify one or more of the subscribers

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(e.g., subscriber **108-1** and/or subscriber **108-2**) that a respective friend is watching the same game.

Via further communications with the management resource, if both subscriber **108-1** and subscriber **108-2** are open to communications with each other, the subscriber **108-1** and subscriber **108-2** can facilitate transmission of images to each other. For example, the network application in content manager **140-1** can send the audio/images of subscriber **108-1** as captured by camera resource **175-1** over the web channel to management resource **110-6**. Management resource **110-6** forwards the audio/images of the subscriber **108-1** as captured by camera resource **175-1** to the network application in content manager **140-2** that displays the images/audio as a picture-in-picture over the football game rendered in display screen **130-2**.

In a reverse direction, the network application in content manager **140-2** can send the audio/images of subscriber **108-2** as captured by camera resource **175-2** over a respective web channel to management resource **110-6**. Management resource **110-6** forwards the audio/images of the subscriber **108-2** as captured by the camera resource **175-2** to the network application in content manager **140-1** that displays the images/audio as a picture-in-picture over the football game rendered in display screen **130-1**.

Accordingly, each subscriber can view the other subscriber and communicate with each other while watching the same football game.

FIG. **11** is an example diagram illustrating a computer architecture in which to execute one or more embodiments as discussed herein.

Any of the different processing techniques can be implemented via execution of software code on a computer system.

For example, as shown, computer system **151** (e.g., a computer device) of the present example can include an interconnect **511** that couples computer readable storage media **512** such as a non-transitory type of media (i.e., any type of hardware storage medium) in which digital information can be stored and retrieved. The computer system **151** can further include processor resource **513** (e.g., one or more processor devices), I/O interface **514**, communications interface **517**, etc.

As its name suggests, I/O interface **514** provides connectivity to external resources or devices control devices **170**, one or more display screens **130**, etc.

Computer readable storage medium **512** can be any hardware storage device to store data such as memory, optical storage, hard drive, floppy disk, etc. In one embodiment, the computer readable storage medium **512** stores instructions and/or data.

Communications interface **517** enables the computer system **151** and one or more processor resource **513** to communicate over a resource such as network **190-3**. I/O interface **514** enables processor resource **513** to perform functions such as receive control input from a respective subscriber, control a respective display screen, etc.

As shown, computer readable storage media **512** can be encoded with content manager application **140-1-APP** (e.g., software, firmware, etc.) executed by processor resource **513**. Content manager application **140-1-APP** can be configured to include instructions to implement any of the operations as discussed herein.

During operation of one embodiment, processor resource **513** accesses computer readable storage media **512** via the use of interconnect **511** in order to launch, run, execute, interpret or otherwise perform the instructions in content manager application **140-1-APP** stored on computer readable storage medium **512**.

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Execution of the content manager application **140-1-APP** produces processing functionality such as content manager process **140-2-PROC** in processor resource **513**. In other words, the content manager process **140-2-PROC** associated with processor resource **513** represents one or more aspects of executing content manager application **140-1-APP** within or upon the processor resource **513** in the computer system **151**.

Those skilled in the art will understand that the computer system **151** can include other processes and/or software and hardware components, such as an operating system that controls allocation and use of hardware resources to execute content manager **140-1-APP**.

In accordance with different embodiments, note that computer system may be any of various types of devices, including, but not limited to, a set-top box, a mobile computer, a personal computer system, a wireless device, base station, phone device, desktop computer, laptop, notebook, netbook computer, mainframe computer system, handheld computer, workstation, network computer, application server, storage device, a consumer electronics device such as a camera, camcorder, set top box, mobile device, video game console, handheld video game device, a peripheral device such as a switch, modem, router, etc., or in general any type of computing or electronic device.

The computer system **151** may reside at any location or can be included in any suitable resource in network environment **100** to implement functionality as discussed herein.

Functionality supported by the different resources will now be discussed via the flowchart in FIGS. **12-14**. Note that the steps in the flowcharts below can be executed in any suitable order.

FIG. **12** is a flowchart **1200** illustrating an example method facilitating interactive television according to embodiments. Note that there will be some overlap with respect to concepts as discussed above.

In processing block **1210**, the content manager **140-1** receives a request to display a content guide **250** of available content.

In processing block **1220**, in response to receiving the request, the content manager **140-1** initiates display of the content guide **250-1** on a display screen **130-1**.

In processing block **1230**, in the displayed content guide **250-1**, the content manager **140-1** initiates display of multiple selectable content viewing options. A first selectable channel viewing option (such as channel **556**) corresponds to a television channel from which to view content **113-2** originating from a content sponsor **105-1**. A second channel viewing option corresponds to an auxiliary channel (e.g., **556 WEB**) with respect to the television channel from which to access available over-the-top content **114** associated with the content **113-2** originating from the content sponsor **105-1**. Content originated by the content sponsor **105-1** includes any content provided by or made available by the content sponsor **105-1**.

FIG. **13** is a flowchart **1300** illustrating an example method of interactive television according to embodiments. Note that there will be some overlap with respect to concepts as discussed above.

In processing block **1310**, the content manager **140-1** renders content received over a cable network channel on display screen **130-1**. The cable network channel can be allocated to distribute content originating from a content sponsor assigned to the cable network channel.

In processing block **1320**, the content manager **140-1** receives a request to access web content associated with the cable network channel.

In response to receiving the request: In processing block **1340**, the content manager **140-1** maps an identity of the cable

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network channel currently displayed on the display screen 130-1 to a network address of a server resource from which the web content (i.e., supplemental content) associated with the cable network channel is retrievable. In processing block 1350, the content manager 140-1 retrieves the web content from a server resource as specified by the network address. In processing block 1360, the content manager 140-1 initiates display of the retrieved web content on the display screen 130-1.

FIG. 14 is a flowchart 1400 illustrating an example method of interactive television according to embodiments. Note that there will be some overlap with respect to concepts as discussed above.

In processing block 1410, while rendering a television program on a display screen 130-1, the content manager 140-1 receives a command to view web content associated with the rendered television program.

In processing block 1420, subsequent to and in response to receiving the command, the content manager 140-1 maps an identity of the television program being played back to a network address from which the web content associated with the television program is retrievable.

In processing block 1430, the content manager 140-1 retrieves the web content from a server resource as specified by the network address.

In processing block 1440, the content manager 140-1 initiates display of the web content on the display screen 130-1.

FIG. 15 is an example diagram illustrating a content guide according to embodiments herein.

In this example embodiment, assume that the content manager 140-1 receives a request from subscriber 108-1 to display content guide 250-3 on display screen 130-1. In response to receiving the request, the content manager 140-1 initiates display of the content guide 250-3 on the display screen 130-1.

The content guide 250-3 includes a display of multiple selectable channel viewing options. For example, the user 108-1 can move selection window 260 about regions of display screen 130-1 to select any of the available channels of content.

By way of a non-limiting example, channel 950 represents a first selectable channel viewing option that corresponds to a cable network television channel (such as ESPN2™) from which to retrieve content (e.g., a respective college basketball game #1) originating from a first content sponsor such as ESPN.

Channel 951 is a second selectable channel viewing option that corresponds to an auxiliary channel (e.g., an over-the-top channel) from which to access over-the-top content available from a second content sponsor such as Facebook™.

Channel 952 is a third selectable channel viewing option that corresponds to an auxiliary channel (e.g., an over-the-top channel) from which to access over-the-top content available from a third content sponsor such as Netflix™.

Via selection of any of the channels using selection window 260, the content manager 140-1 receives notification to tune to a respective channel.

Note that in addition to moving the respective navigation window 260 to select and view content as specified by the corresponding channel, the subscriber 108-1 can press one or more buttons on the control device 170-1 to select the appropriate sequence of numbers to select a channel. For example, the subscriber 108-1 can press buttons '9', '5', and '0' to select the channel 950; the subscriber 108-1 can press buttons '9', '5', and '1' to select the channel 951; the subscriber 108-1 can press buttons '9', '5', and '2' to select the channel 952;

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and so on. Accordingly, navigation and selection of a respective channel can be achieved in a number of different ways.

By way of further non-limiting example, the content guide 250-3 can initiate display of additional information in the different content viewing options. For example, channel 950 can be a content viewing option including a notification specifying a title assigned to respective playable content available in a scheduled time slot of the television channel 950; channel 951 can be a content viewing option including display of a notification specifying availability of the over-the-top content such as personal account information associated with Facebook™ via an auxiliary channel; channel 952 can be a content viewing option including display of a notification specifying availability of the over-the-top content such as a Netflix content guide via an auxiliary channel; and so on.

Thus, as shown, available over-the-top content can be assigned a numerical value in a numerical sequence. The content manager 140-1 displays the content viewing options in accordance with the numerical channel sequence. More specifically, each numerical channel value (e.g., 950, 951, 952, . . . ) in the numerical channel sequence can be configured to specify a corresponding channel from which to retrieve available content. In the present example, the content manager 140-1 displays a first numerical channel value such as channel 950 to indicate content available from content sponsor ESPN2™ in content guide 250-3; the content manager 140-1 displays a second numerical channel value such as channel 951 to indicate content available from content sponsor Facebook™ in content guide 250-3; the content manager 140-1 displays a third numerical channel value such as channel 952 to indicate content available from content sponsor Netflix™ in content guide 250-3; and so on.

In one embodiment, responsive to receiving selection of numerical channel value 951, the content manager 140-1 maps the numerical channel value 951 to a respective network address associated with Facebook™. The network address indicates a server resource from which to retrieve the over-the-top content for retrieval and viewing on display screen 130-1. To display personal Facebook account information on display screen 130-1, the content manager 140-1 utilizes the network address to communicate with the server resource over an auxiliary channel (e.g., an over-the-top channel supported by one or more of data channels 123).

More specifically, the content manager 140-1 transmits a content request message over the auxiliary channel to retrieve the over-the-top content available from Facebook™. The content manager 140-1 receives the requested over-the-top content over the auxiliary channel from the server resource and renders the over-the-top content on the display screen 130-1. One embodiment herein can include storing personal settings associated with a respective subscriber and, upon selection of the channel 951, the content manager 140-1 utilizes the personal settings to request the personal information from the Facebook™ website for the subscriber. Accordingly, accessing a subscriber account can be achieved by merely selecting the channel 951.

Accordingly, embodiments herein can include: responsive to receiving selection of channel 951 in the content guide 250 (such as a cable network content guide), the content manager 140-1 initiates retrieval of personal social networking account information from a Facebook™ content sponsor website over an auxiliary channel. The content manager 140-1 then initiates display of the personal social networking account information on the display screen 130-1.

In a similar manner, the subscriber 108-1 can select channel 952. Responsive to receiving selection of the channel 952 (e.g., a selectable content viewing option) in the content guide

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**250-3**, the content manager **140-1** initiates retrieval of content such as an over-the-top content guide for viewing different over-the-top content available from 3<sup>rd</sup> party content provider Netflix™. The content manager **140-1** initiates display of the over-the-top Netflix content guide on display screen **130-1**.

Via further input to the retrieved and displayed over-the-top Netflix™ content guide, the subscriber can select a specific title of content amongst multiple titles of content displayed in the over-the-top Netflix™ content guide. For example, the subscriber **108-1** can provide further input of which of multiple content selections the subscriber **108-1** would like to retrieve for viewing on display screen **130-1**.

As previously discussed, via selection of channel **950** in content guide **250-3** by subscriber **108-1**, the content manager **140-1** tunes to the cable network television channel **950** such as a broadcast channel, IPTV channel, etc. In such an instance, the content manager **140-1** decodes a video signal received on the cable network television channel **950** and then renders video derived from the video signal on the display screen **130-1**.

FIG. 16 is an example diagram illustrating of a method of providing notification of content from multiple types of sources according to embodiments herein.

In processing block **1610**, the content manager **140-1** receives a request to display a content guide **250** of available content.

In processing block **1620**, in response to receiving the request, the content manager **140-1** initiates display of the content guide **250-3** on the display screen **130-1**.

In processing block **1610**, in the displayed content guide **250-3**, the content guide **250-3** initiates display of multiple selectable channel viewing options. A first selectable channel viewing option corresponds to a cable network television channel from which to access content originating from a first content sponsor. A second selectable channel viewing option corresponds to an auxiliary channel from which to access over-the-top content available from a second content sponsor.

Note again that techniques herein are well suited for use in a cable network environment. However, it should be noted that embodiments herein are not limited to use in such applications and that the techniques discussed herein are well suited for other applications as well.

#### Additional Embodiments

As previously discussed, conventional techniques of accessing content from different sources suffer from deficiencies. For example, assume that a subscriber views a rendition of content received over a primary broadcast channel. Certain subscribers may be interested in viewing additional content associated with the content transmitted in the primary broadcast channel. According to conventional techniques as discussed above, to view supplemental content, a subscriber would have to operate a different device such as a computer at a different location to view the additional information associated with the corresponding content received in the primary broadcast channel.

As a specific example, assume that the subscriber views a sporting event such as a golf tournament on the primary broadcast channel. If the user would like to view additional details regarding the golf event (or other matter), the subscriber typically would have to operate a remotely located computer device (with respect to a television playing back the broadcasted content) to research the matter of interest. For example, the user would have to log onto a respective computer and operate a web browser to obtain the extra information. This is undesirable, as the subscriber typically must

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leave the room to operate the computer device. In certain instances, the content sponsors may provide additional content associated with the content broadcasted in the primary broadcast channel. Such content may be available as over-the-top content.

Embodiments herein include enabling a user such as a cable network subscriber to more easily retrieve and play back supplemental content associated with a content sponsor, television program, television channel, etc. In certain instances, embodiments herein enable a user to have a more interactive experience with respect to viewing content available from multiple sources.

More specifically, one embodiment herein includes a content distribution resource. The content distribution resource initiates distribution of corresponding content over a primary broadcast channel of a communication link to a subscriber. The content distribution resource receives selection of over-the-top content from the subscriber. In one embodiment, the over-the-top content is supplemental content associated with the corresponding content distributed over the primary broadcast channel. In response to receiving the selection, the content distribution resource transmits the over-the-top content in a secondary channel of the communication link to the subscriber.

Another embodiment herein includes a content manager disposed in a location such as a subscriber domain in a cable network environment. The content manager initiates play back of corresponding content on a display screen. The content manager receives the corresponding content over a primary broadcast channel selected amongst multiple available channels. The content manager can receive selection of over-the-top content available over a secondary channel with respect to the primary broadcast channel. In one embodiment, the over-the-top content is supplemental content associated with the corresponding content received in the primary broadcast channel. In response to receiving the selection, the content manager retrieves the over-the-top content on the secondary channel, and initiates play back of the over-the-top content on the display screen for viewing by the subscriber.

These and more detailed embodiments are discussed below.

Any of the resources as discussed herein can include one or more computerized devices, servers, base stations, wireless communication equipment, communication management systems, workstations, handheld or laptop computers, or the like to carry out and/or support any or all of the method operations disclosed herein. In other words, one or more computerized devices or processors can be programmed and/or configured to operate as explained herein to carry out different embodiments of the invention.

Yet other embodiments herein include software programs to perform the steps and operations summarized above and disclosed in detail below. One such embodiment comprises a computer program product including a non-transitory computer-readable storage medium (i.e., any computer readable hardware storage medium) on which software instructions are encoded for subsequent execution. The instructions, when executed in a computerized device having a processor, program and/or cause the processor to perform the operations disclosed herein. Such arrangements are typically provided as software, code, instructions, and/or other data (e.g., data structures) arranged or encoded on a non-transitory computer readable storage medium such as an optical medium (e.g., CD-ROM), floppy disk, hard disk, memory stick, one or more memory chips, etc., or other non-transitory media such as firmware or short code in one or more ROM, RAM, PROM, etc., or as an Application Specific Integrated Circuit (ASIC),

etc. The software or firmware or other such configurations can be installed onto a computerized device to cause the computerized device to perform the techniques explained herein.

Accordingly, embodiments herein are directed to a method, system, computer program product, etc., that supports operations as discussed herein.

One embodiment includes computer readable storage hardware and/or system having instructions stored thereon. The instructions, when executed by computer processor hardware (such as one or more computer devices), cause the computer processor hardware to: on a display screen, initiate play back of corresponding content received on a primary broadcast channel selected amongst multiple available channels; receive selection of over-the-top content, the over-the-top content available over a secondary channel with respect to the primary broadcast channel, the over-the-top content being supplemental content associated with the corresponding content received in the primary broadcast channel; and in response to receiving the selection: i) retrieve the over-the-top content on the secondary channel, and ii) initiate play back of the over-the-top content on the display screen.

Another embodiment includes computer readable storage hardware and/or system having instructions stored thereon. The instructions, when executed by computer processor hardware (such as one or more computer devices), cause the computer processor hardware to: initiate distribution of corresponding content over a primary broadcast channel of a communication link to a subscriber; receive selection of over-the-top content from the subscriber, the over-the-top content being supplemental content associated with the corresponding content distributed over the primary broadcast channel; and in response to receiving the selection, transmit the over-the-top content in a secondary channel of the communication link to the subscriber.

The ordering of the steps above has been added for clarity sake. Note that any of the processing steps as discussed herein can be performed in any suitable order.

Other embodiments of the present disclosure include software programs and/or respective hardware to perform any of the method embodiment steps and operations summarized above and disclosed in detail below.

It is to be understood that the system, method, apparatus, instructions on computer readable storage media, etc., as discussed herein also can be embodied strictly as a software program, firmware, as a hybrid of software, hardware and/or firmware, or as hardware alone such as within a processor, or within an operating system or a within a software application.

As discussed herein, techniques herein are well suited for use in distributing main content as well as corresponding supplemental content in a cable network environments. However, it should be noted that embodiments herein are not limited to use in such applications and that the techniques discussed herein are well suited for other applications as well.

Additionally, note that although each of the different features, techniques, configurations, etc., herein may be discussed in different places of this disclosure, it is intended, where suitable, that each of the concepts optionally can be executed independently of each other or in combination with each other. Accordingly, the one or more present inventions as described herein can be embodied and viewed in many different ways.

Now, more particularly, FIG. 17 is an example diagram illustrating distribution of content according to embodiments herein.

As shown and previously discussed, subscriber domain 150-1 can include a content manager 140-1 such as a set-top box or other suitable processing hardware and/or software.

Content manager 140-1 can tune to any of multiple broadcast channels or video on demand channels to retrieve content. Content manager 140-1 has the ability to tune to any such channels in accordance with user input.

In this example embodiment, assume that the user 108-1 (such as a subscriber in a cable network environment) provides control input to content manager 140-1 to tune to channel 122 received over communication link 191. Content distribution resource 125-1 initiates distribution of corresponding content A over channel 122 (such as a primary broadcast channel) of communication link 191 to subscriber domain 150-1. In one embodiment, content manager 140-1 in subscriber domain 150-1 receives content A (or content 113-2) as content broadcasted in a particular timeslot.

As discussed herein, in addition to receiving content A broadcasted over communication link 191, the user 108-1 can initiate retrieval of related content (such as over-the-top content associated with content in the primary broadcast channel) over one or more auxiliary channels. For example, assume in this example embodiment that the communication link 191 includes a data channel such as channel 123-1 allocated for retrieval of over-the-top content such as content A' from a respective such as a server.

Assume that the content manager 140-1 receives selection of over-the-top content A' from the user 108-1. In this example embodiment, the over-the-top content A' is supplemental content associated with the corresponding content A distributed over the primary broadcast channel 122.

The user 108-1 selection of the content A' can include transmitting a request message from content manager 140-1 through content distribution resource 125-1 to a server resource that serves respective content A' over channel 123-1 to the content manager 140-1. The request message can be transmitted in accordance with any suitable over-the-top communication protocol. In response to receiving the selection, the server resource 110-2 transmits content 114 (content A') to distribution resource 125-1; distribution resource 125-1 transmits the over-the-top content in channel 123-1 of the communication link 191 to the content manager 140-1.

In one embodiment, content manager 140-1 initiates storage of the received content A and content A' in storage resource 1780. For example, content manager 140-1 can be configured to include storage resource 1780 (such as a digital video recorder) to store the content received over channel 122 and channel 123-1 (or any other channels). The storage resource 1780 can be located locally or remotely with respect to subscriber domain 150-1. Subsequent to storage of the over-the-top content A' and the corresponding content A in the storage resource 1780, the user 108-1 controls play back of the stored content on the display screen 130-1.

By further way of a non-limiting example, content A' can be auxiliary or supplemental content that is streamed in a linear or scheduled manner over channel 123-1 (such as secondary channel) as supplemental content with respect to content A transmitted in channel 122 (such as a primary broadcast channel). In such an embodiment, transmission of the content A' over channel 123-1 as synchronous content with respect to content A in primary broadcast channel 122 enables the viewer to view, on play back, supplemental content with respect to the content A.

Alternatively, as discussed above, content A' can be non-synchronous data that is not synchronized to portions of content A.

Content A and content A' can be played back as the content is received over communication link 191. If stored, the content can be played back from storage resource 1780. Play back of the content (content A and/or content A') on display

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screen 130-1 from the storage resource 1780 enables the respective user 108-1 to perform functions such as fast forward, rewind, pause, etc., with respect to content.

In one embodiment, the user 108-1 can provide input indicating which available content to store in storage resource 1780 over time. As previously discussed, auxiliary or supplemental content may or may not be available for corresponding content available in a primary broadcast channel. If supplemental content (such as content A') is available for respective content, the content manager 140-1 can provide notification that supplemental content is available for recording along with the content A. Upon receiving an input command to record particular content A on a primary broadcast channel, as well a command to record content A', the content manager 140-1 records and stores the respective content in storage resource 1780. Accordingly, a respective user 108-1 can decide whether to store supplemental content A' when programming the content manager 140-1 to record content A.

In one embodiment, the user 108-1 can provide input to content manager 140-1 to display recorded information content guide 1720. As its name suggests, the recorded information content guide 1720 indicates what content has been stored in the storage resource 1780. In one embodiment, in response to receiving input from the user 108-1 to display a listing of content stored in storage resource 1780, the content manager 140-1 initiates display of a respective notification (such as recorded information content guide 1720).

In this example, the recorded information content guide 1720 indicates that both the over-the-top content A' (received over channel 123-1) and the corresponding content A (received in the primary broadcast channel such as channel 122) have been stored in the storage resource 1780. For example, the recorded information content guide 1720 indicates that content A was received over primary broadcast channel 556 and that content A' is available and was received over a secondary channel 556WEB (such as an over-the-top content channel). In this example embodiment, the recorded information content guide 1720 also indicates that content B is stored in storage resource 1780 and was received over primary broadcast channel 558 and is available for retrieval and play back.

FIG. 18 is an example diagram illustrating synchronization of content on multiple channels according to embodiments herein.

As previously discussed, and further described herein below, the corresponding content A' (received on the over-the-top channel 123-1) can be substantially synchronized with respect to the content A (received over the primary broadcast channel). Corresponding synchronization information can indicate a correlation of portions of content A to corresponding portions of content A'. In one embodiment, the synchronization information can be used to switch between play back of the corresponding content A and the over-the-top content A' on the display screen 130-1.

More specifically, as shown, the content A transmitted over the primary broadcast channel (such as channel 556 or a linear channel in which respective content is simultaneously transmitted to multiple subscribers) can include segments of content including segment A-102, A-103, . . . , A-114, etc. Assume that the data stream including segments of content A are transmitted in a respective time slot such as between 5:00 and 5:30 pm.

As shown, the content A' transmitted over the secondary channel (such as channel 556 WEB) can include segments of content including segment A'-548, A'-549, . . . , A'-560, etc., available in the time slot between 5:00 and 5:30 pm. The data stream including segments of content A' can be available and

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transmitted in a respective time slot such as between 5:00 and 5:30 pm as well. Accordingly, the over-the-top content (i.e., content A') received on the over-the-top channel (channel 556 WEB) is linear scheduled content in which the over-the-top content is scheduled for distribution in a same respective time slot as content A.

As mentioned, the segments of content in each data stream (content A and content A') can be synchronized or related to each other. For example, content A and content A' can include video footage associated with a same sporting event such as a football game. Segment A-106 in content A can represent an image of a play taken from one camera angle, corresponding segment A'-552 can represent an image of the same play taken from another angle at the same football event. As mentioned, the channel 123-1 enables retrieval of the supplemental content (content A'). In this manner, the segments of content in each data stream can be related to each other, affording the respective user 108-1 an opportunity to switch between viewing different channel information for the same event.

In one embodiment, during real-time or substantially real-time receipt of content A and content A', the availability of portions (segments) of the over-the-top content A' for play back by the subscriber varies depending on which particular portion of the corresponding content A is being broadcasted to the subscriber over the primary broadcast channel. For example, a respective server resource 110-2 that serves segment A'-552 makes this portion (segment A'-552) of content available at approximately or substantially the same time that content distribution resource 125-1 broadcasts segment A-106 over the channel 122; server resource 110-2 that serves segment A'-555 makes this portion (segment A'-555) of content available at approximately or substantially the same time that content distribution resource 125-1 broadcasts segment A-109 over the channel 122; server resource that serves segment A'-560 makes this portion (segment A'-560) of content available at approximately or substantially the same time that content distribution resource 125-1 broadcasts segment A-114 over the channel 122; and so on. Each of the segments in content A can be mapped to a corresponding segment in content A'.

As previously discussed, in one embodiment, the server resource 1780 stores both streams of content A and content A' in storage resource 1780. Note that stored content can include metadata or synchronization information such as map 1850. Map 1850 can be generated from any suitable resource such as server resource 110-2. Map 1850 can be transmitted in any suitable manner such as over content 123-1.

Map 1850 can include appropriate pointers indicating a correlation between segments in each data stream. For example, via respective pointer information, map 1850 indicates that a location such as segment A'-548 in content A corresponds to segment A-102 in content A'; via respective pointer information, map 1850 indicates that a location such as segment A'-549 in content A' corresponds to segment A-103 in content A; and so on.

Accordingly, map 1850 can be used to identify a relationship between data in one channel and another.

FIG. 19 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

As shown, assume in this example that the content manager 140-1 initiates play back of segments of content A on display screen 130-1. In such an instance, the content manager 140-1 displays a rendition of segments A-102, A-103, A-104, A-105 on display screen 130-1.

During play back, assume that the content manager 140-1 receives a command from the user 108-1 to switchover to play



back of content A' on the display screen 130-1 at around a time T1 of playing back a rendition of segment A-105 on display screen 130-1. In such an instance, to play back content A', the content manager 140-1 uses map 1850 to identify a corresponding location in content A' to play back on display screen 130-1.

As mentioned, if the content A' is stored in storage resource 1780, then the content manager 140-1 obtains the segment A'-552 and subsequent segments such as segments A'-553, A'-554 from storage resource 1780 for play back on display screen 130-1. If the content A is received in substantially real-time over primary broadcast channel 556 (instead of being stored), and the content manager 140-1 receives a respective command to switchover to play back of the content A', the content manager 140-1 can use a respective pointer value as specified by map 1850 to identify which portion of a respective data stream of content A' to retrieve from the server resource 110-2 over channel 123-1 to play back on display screen 130-1. As an alternative, the server resource 110-2 can be configured to transmit the appropriate segment of content A' depending on a time of receiving the request.

In one example embodiment, by way of a non-limiting example, retrieval of the over-the-top content A' can include, from the content manager 140-1: obtaining timing information (such as a pointer value) indicating a current play back location in the corresponding content A played back on the display screen 130-1; forwarding the timing information to a server resource distributing the over-the-top content A'. The server resource can be configured to use map 1850 to correlate the timing information to a corresponding location in the content A' data stream. From the server resource over channel 123-1, the content manager 140-1 controlled by user 108-1 receives the over-the-top content at the corresponding location in the data stream; and initiates display of the over-the-top content (such as segments A'-552, A'-553, A'-554) at the corresponding location on display screen 130-1.

During further play back of segments A'-552, A'-553, A'-554 on display screen 130-1, assume that the content manager 140-1 receives a command from the user 108-1 at approximately time T2 to switchover to play back of content A again on the display screen 130-1 at around a time of playing back a rendition of segment A'-554 on display screen 130-1. In such an instance, to play back content A, the content manager 140-1 uses map 1850 to identify a corresponding location in content A to play back on display screen 130-1.

As mentioned, if the content A is stored in storage resource 1780, then the content manager 140-1 obtains the segment A'-109 and subsequent segments such as segments A-109, A-110, etc.) from storage resource 1780 for play back on display screen 130-1. If the content A' is received in substantially real-time (instead of being stored in storage resource 1780), and the content manager 140-1 receives a respective command to switchover to play back of the content A again, the content manager 140-1 can use a respective pointer value or timing information as specified by map 1850 to identify which portion of a respective data stream of content A to retrieve from the server resource 110-2 over channel 123-1 to play back on display screen 130-1.

Play back of content from can include display of content A using all picture elements available in display screen 130-1. Upon playing back content A', all of the picture elements of the display screen 130-1 can be allocated to display a rendition of content A'.

As an example embodiment, note that play back of the supplemental content A' can include display of the content A' as a picture in picture. For example, the content manager 140-1 can be configured to continue playing back the corre-

sponding content A (such as segments A-106, A-107, A-108) as background video image on the display screen 130-1 while the content manager 140-1 initiates display of the over-the-top content A' (such as segments A'-552, A'-553, A'-554) as an overlay with respect to the background video image.

Note that one or more segments of content can be encoded to include a displayable notification indicating availability of the over-the-top content for retrieval. For example, in accordance with one embodiment, the user 108-1 can operate content manager 140-1 to play back content A received on channel 556 as mentioned. Note that segment A-105 (or other segment in content A) can include notification information that when played back on the display screen 130-1, indicates that corresponding content (such as a different camera angle) is currently available for retrieval by the user 108-1 on channel A'.

Accordingly, embodiments herein include initiating display of a notification on the display screen 130-1 during play back of a rendition of the corresponding content A on the display screen 130-1. The notification on display screen 130-1 indicates availability of the corresponding over-the-top content A'. In response to receiving input from a respective user 108-1 to switchover to the alternative channel and play back of the over-the-top content A', the content manager 140-1 plays back the content A' available over channel 123-1.

In a similar manner, note that one or more segments of content A' can include notification information indicating corresponding segments of content A that are currently available in channel 122 for play back on the display screen 130-1. Accordingly, as shown, the user 108-1 can initiate switching between play back of content A and content A' on display screen 130-1.

FIG. 20 is an example diagram-illustrating play back of content received over multiple channels according to embodiments herein.

As an alternative to playing back content as described in FIG. 19, embodiments herein can include playing back content as shown in FIG. 20. For example, initially, the content manager 140-1 initiates display of segments A-102, A-103, A-104 and A-105 on display screen 130-1. In response to receiving the selection of content A' at time T3, the content manager 140-1 discontinues play back of the corresponding content A on the display screen 130-1. The content manager 140-1 can be configured to store a pointer value (or timing information) specifying a location in the corresponding content where play back of the corresponding content was discontinued. In this example, the content manager 140-1 discontinues play back of content A at a time between segments A-105 and A-106 in channel A.

The location at segment A'-552 in the data stream at content A' corresponds to the current location (between segment A-105 and A-106) in content A. In response to receiving the command to play back content A' at or around time T3, the content manager 140-1 retrieves segments of content A' (such as segments A'-552, A'-553, etc.) from a respective server resource or from storage resource 1780 in a manner as previously discussed.

Recall that content A' can be scheduled content transmitted in a respective time slot. As shown, in accordance with map 1820, the available segment in data stream content A' at or around time T3 is segment A'-552. Accordingly, content manager 140-1 retrieves and plays back a rendition of segment A'-552 on display screen 130-1.

While the content manager 140-1 plays back segments A'-552, A'-553, etc., if desired, the content manager 140-1 can store segments A-106, A-107, A-108, etc.

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Subsequent to time T3, assume that the content manager **140-1** receives a command at or around time T4 to resume play back of the corresponding content A on the display screen **130-1** again. In such an instance, the content manager **140-1** in this example embodiment initiates play back of the corresponding content A at the location specified by the previously stored pointer value. For example, content manager **140-1** retrieves the stored pointer value or timing information and initiates play back of segments A-106, A-107, A-108, etc., on display screen **130-1**.

In this manner, inserting play back of segments such as segments A'-552, A'-553, etc., between segments A-105 and segment A-106 enables the user **108-1** to view an entirety of content A, even though the user **108-1** happens to switchover to play back of content A' for some amount of time.

As previously discussed, the content manager **140-1** can be configured to initiate display of a notification on the display screen **130-1** during play back of a rendition of the corresponding content A on the display screen **130-1**. In such an instance, the notification can indicate availability of the over-the-top content A' over channel **123-1**.

FIG. 21 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

As previously discussed, availability of the different portions of the over-the-top content A' for play back on the display screen **130-1** from the secondary channel (such as channel 556 WEB) varies depending on which particular portion of the corresponding content A is being played back by the subscriber or which particular portion of the content is broadcasted to subscribers over channel 556 in a cable network environment.

In this example embodiment, instead of being linear content transmitted in channel 556 WEB, the content A' available over channel 556 WEB can be video or non-video available for viewing along with or in lieu of content A. For example, supplemental content X is available for viewing at or around segment A-105; supplemental content Y is available for viewing at or around time A-113; and so on.

Note that supplemental content X can be associated with segment A-105 or a range of segments such as segments A-102 through A-107; supplemental content Y can be associated with segment A-111 or a range of segments such as segments A-109 through A-115; and so on.

In one embodiment, the over-the-top content A' received on the secondary channel is non-video content such as static images (such as a text-based article). Accordingly, the user can select supplemental content X (such as a text-based article) while viewing or playing back content A on channel 556. Further examples are presented below.

FIG. 22 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

Assume that the content manager **140-1** receives a command to play back content A on display screen **130-1**. As previously discussed, the content A can be obtained from channel 556 or from storage. In accordance with the command, assume that the content manager **140-1** initiates play back of segments A-102, A-103, etc., on display screen **130-1**. At or around time T5, assume that the user **108-1** provides input to play back supplemental content X available over channel 556 WEB.

Assume in this example that supplemental content X is video content. In such an instance, and in response to receiving the command, the content manager **140-1** initiates play back of the over-the-top supplemental content X at a beginning location of the supplemental content X regardless of a

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current location of playing back the corresponding content A on the display screen. For example, at or around time T5, the content manager **140-1** stores a pointer value or timing information indicating when the switchover from content A to content A' occurs (around time T5). In one embodiment, to obtain supplemental content X, the content manager **140-1** receives notification of a current play back location (at or around time T5) with respect to the corresponding content A received over the primary broadcast channel. The content manager **140-1** (or other suitable resource such as content distribution resource **125-1**) maps the current play back location to an appropriate portion of content A' (supplemental content X). The content distribution resource **125-1** initiates distribution of the portion of over-the-top content over the channel **123-1** to the content manager **140-1** that, in turn, initiates display of a rendition of supplemental content X.

The supplemental content X can be video of a defined play back length. Eventually, the entirety of supplemental content X can be played back on the display screen **130-1** or the user **108-1** can input a respective command indicating to switch back to play back of the original content A on display screen **130-1**. In such an instance, at or around time T6, the content manager **140-1** continues to play back the content A at a segment as specified by the previously stored pointer value or timing information indicating when the user switched over from playing content A to content A'.

In this example embodiment, content manager **140-1** initiates play back of segment A-106, A-107, A-108, etc., on display screen **130-1**. Accordingly, play back of the original content A is put on pause while the content manager **140-1** plays back supplemental content X for viewing on the display screen **130-1**.

FIG. 23 is an example diagram illustrating play back of content received over multiple channels according to embodiments herein.

As an alternative to pausing play back of content A during play back of respective content A on display screen **130-1**, embodiments herein can include resuming play back of the content A again as if the content A continued to play in the background. For example, at or around time T7, assume that the content manager **140-1** initiates play back of supplemental content X on display screen **130-1**. Upon completion of playing back supplemental content X or receiving a switchover command at or around time T8, the content manager **140-1** initiates play back of segment A-109, A-110, etc., on display screen **130-1**. Thus, segments A-106, A-107, and A-108 can be skipped in favor of playing back a sequence of segments associated with supplemental content X.

FIG. 24 is an example diagram illustrating multiple auxiliary channels on which to receive related content according to embodiments herein.

As previously discussed, content guide **250-1** in FIG. 2 can include identification of a respective supplemental channel (e.g., channel 556 WEB) on which to retrieve content associated with a primary broadcast channel (such as channel 556).

As shown in FIG. 24, the content guide **250-2** can be configured to include multiple supplemental channels on which to retrieve information associated with a respective content sponsor. For example, channel 556 can include corresponding auxiliary channel 556 WEB1, channel 556 WEB2, and so on.

Supplemental content may be available over a respective auxiliary channel at different times. For example, supplemental content associated with channel 556 is not available over channel 556 WEB1 between 7:00 and 7:30 pm. Supplemental

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content associated with channel 556 is available over channel 556 WEB1 between 7:30 and 8:30 pm.

In one non-limiting example embodiment, content available in channel 556 WEB1 includes a pre-programmed data stream available for play back on the display screen **130-1**. In response to selection of the secondary channel (channel 556 WEB1), the content manager **140-1** initiates display of the pre-programmed data stream on display screen **130-1**.

In one embodiment, the content sponsor automatically generates the pre-programmed content. For example, the supplemental content available over channel 556 WEB1 can be automatically generated by the content sponsor upon selection of the channel 556 WEB1. In one non-limiting example embodiment, the content sponsor automatically curates the content transmitted over channel 556 WEB1 to include the top five news stories of the day. In such an instance, via selection of channel 556 WEB1, the user **108-1** can bypass play back of a rendition of the content A available in channel 556 and view the top five stories available as over-the-top content A' over channel **123-1**.

In one embodiment, the user **108-1** can configure what type of content will be played back on the pre-programmed over-the-top content channel. For example, the user **108-1** may be interested in playing back only recent stock market news associated with the sponsor channel 556. In this instance, the user **108-1** can pre-program the supplemental channel 556 WEB1 to play back the top five stock market stories when the respective user **108-1** selects the respective channel 556 WEB1 in the content guide **250-2**. In such an instance, upon selection of the channel 556 WEB1 by the subscriber in subscriber domain **150-1**, the content manager **140-1** communicates with a respective server resource that serves top five stock market stories at the time of the request.

In a similar manner, a second subscriber such as a subscriber at a different subscriber domain **150-2** may be interested in only playing back sports news associated with the sponsor channel 556. In this instance, the user can pre-program the supplemental channel 556 WEB1 to play back the top five sports stories when the respective subscriber selects the respective channel 556 WEB1 in the content guide **250-2** at subscriber domain **150-2**. Upon selection of the channel 556 WEB1 by the subscriber in subscriber domain **150-2**, the respective content manager in subscriber domain **150-2** communicates with a respective server resource that serves top five sports stories at the time of the request.

In this manner, each of multiple subscribers can configure respective supplemental content received over channel 556 WEB1 to perform different functions.

Further in this example, the content guide **250-2** can include a second supplemental channel (channel 556 WEB2). In one embodiment, channel 556 WEB2 provides the user **108-1** access to a content navigation guide from which a user viewing the display screen **130-1** manually selects from the content navigation guide to retrieve selected content over the secondary channel. For example, in response to selection of the channel 556 WEB2, the content manager **140-1** can be configured to communicate with an appropriate web site and initiates display of the content viewing options **720** displayed in FIG. 7. The user **108-1** is then able to navigate amongst multiple possible viewing options for play back of respective content on display screen **130-1**.

FIG. 25 is an example diagram illustrating a method of managing play back of content on multiple channels according to embodiments herein.

In processing block **2510** of flowchart **2500**, the content manager **140-1** initiates play back of corresponding content A

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on display screen **130-1**. The corresponding content A is received on a primary broadcast channel selected amongst multiple available channels.

In processing block **2520**, the content manager **140-1** receives selection of over-the-top content A' available over a secondary channel with respect to the primary broadcast channel. The over-the-top content is supplemental content associated with the corresponding content transmitted in the primary broadcast channel.

In processing block **2530**, in response to receiving the selection, the content manager **140-1**: i) retrieves the over-the-top content A', and ii) initiates play back of the over-the-top content A' on the display screen **130-1**.

FIG. 26 is an example diagram illustrating a method of distributing content according to embodiments herein.

In processing block **2610** of flowchart **2600**, the content distribution resource **125-1** initiates distribution of corresponding content A over a primary broadcast channel of a communication link **191** to a subscriber (such as user **108-1** in subscriber domain **150-1**).

In processing block **2620**, the content distribution resource **125-1** receives selection of over-the-top content A' from a user **108-1** (subscriber). The over-the-top content is supplemental content associated with the corresponding content A distributed over the primary broadcast channel.

In processing block **2630**, in response to receiving the selection, the content distribution resource **125-1** transmits the over-the-top content A' in a secondary channel of the communication link **191** to the subscriber.

Based on the description set forth herein, numerous specific details have been set forth to provide a thorough understanding of claimed subject matter. However, it will be understood by those skilled in the art that claimed subject matter may be practiced without these specific details. In other instances, methods, apparatuses, systems, etc., that would be known by one of ordinary skill have not been described in detail so as not to obscure claimed subject matter. Some portions of the detailed description have been presented in terms of algorithms or symbolic representations of operations on data bits or binary digital signals stored within a computing system memory, such as a computer memory. These algorithmic descriptions or representations are examples of techniques used by those of ordinary skill in the data processing arts to convey the substance of their work to others skilled in the art. An algorithm as described herein, and generally, is considered to be a self-consistent sequence of operations or similar processing leading to a desired result. In this context, operations or processing involve physical manipulation of physical quantities. Typically, although not necessarily, such quantities may take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared or otherwise manipulated. It has been convenient at times, principally for reasons of common usage, to refer to such signals as bits, data, values, elements, symbols, characters, terms, numbers, numerals or the like. It should be understood, however, that all of these and similar terms are to be associated with appropriate physical quantities and are merely convenient labels. Unless specifically stated otherwise, as apparent from the following discussion, it is appreciated that throughout this specification discussions utilizing terms such as "processing," "computing," "calculating," "determining" or the like refer to actions or processes of a computing platform, such as a computer or a similar electronic computing device, that manipulates or transforms data represented as physical electronic or magnetic quantities within memories, registers, or other information storage devices, transmission devices, or display devices of the computing platform.

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While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present application as defined by the appended claims. Such variations are intended to be covered by the scope of this present application. As such, the foregoing description of embodiments of the present application is not intended to be limiting. Rather, any limitations to the invention are presented in the following claims.

We claim:

1. A method comprising:

on a display screen, initiating play back of corresponding content received on a primary broadcast channel selected amongst multiple available channels;

during the play back of the corresponding content on the display screen, receiving selection of over-the-top content available over a secondary channel with respect to the primary broadcast channel, the over-the-top content being supplemental content associated with the corresponding content in the primary broadcast channel; and in response to receiving the selection during the play back: i) retrieving the over-the-top content, and ii) initiating play back of the over-the-top content on the display screen;

wherein the over-the-top content received on the secondary channel is linear scheduled content in which the over-the-top content is scheduled for distribution in the respective time slot, a first portion of the over-the-top content synchronized for playback at a time of playing back a first segment of the corresponding content, a second portion of the over-the-top content synchronized for playback at a time of playing back a second segment of the corresponding content;

wherein the over-the-top content is a data stream; and

wherein retrieving the over-the-top content includes:

obtaining timing information indicating a current play back location in the corresponding content played back on the display screen;

forwarding the timing information to a server resource distributing the over-the-top content, the server resource correlating the timing information to a corresponding location in the data stream;

from the server resource, receiving the over-the-top content at the corresponding location in the data stream; and

initiating, on the display screen, display of the over-the-top content at the corresponding location.

2. The method as in claim 1, wherein availability of portions of the over-the-top content for play back on the display screen from the secondary channel varies depending on which particular portion of the corresponding content is being broadcasted to subscribers in a cable network environment.

3. The method as in claim 2, wherein the primary broadcast channel is a linear channel in which the corresponding content is scheduled for broadcast in a respective time slot in the primary broadcast channel.

4. The method as in claim 3, wherein the over-the-top content received on the secondary channel is non-video content, different portions of which are available depending on a location of the corresponding content being viewed on the display screen.

5. The method as in claim 1 further comprising: storing the corresponding content received over the primary channel;

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storing the over-the-top content received over the secondary channel, the over-the-top content time synchronized with respect to the corresponding content via synchronization information; and

utilizing the synchronization information to switch between play back of the corresponding content and the over-the-top content on the display screen.

6. The method as in claim 1 further comprising:

initiating display of a notification on the display screen during play back of a rendition of the corresponding content on the display screen, the notification indicating availability of the over-the-top content.

7. The method as in claim 1 further comprising:

storing the over-the-top content and the corresponding content in a digital video recorder accessible to a subscriber controlling play back of video on the display screen; and

initiating display of notification indicating that both the over-the-top content and the corresponding content have been stored in the digital video recorder.

8. The method as in claim 1, wherein the over-the-top content is synchronized with respect to the corresponding content in the primary broadcast channel, the method further comprising:

playing back the corresponding content as a background image on the display screen; and

initiating display of the over-the-top content as an overlay with respect to the background image.

9. The method as in claim 1, wherein the over-the-top content received on the secondary channel includes a content navigation guide from which a user viewing the display screen manually selects from the content navigation guide to retrieve selected content over the secondary channel.

10. The method as in claim 1 further comprising:

during the play back of the corresponding content, initiating display of a notification on the display screen, the displayed notification indicating availability of the over-the-top content for retrieval by a user viewing the display screen.

11. The method as in claim 10, wherein the notification is assigned for providing notice of availability of the over-the-top content for selective play back with respect to a particular segment of the corresponding content received on the primary broadcast channel, the method further comprising:

in response to detecting current play back of the particular segment of the corresponding content on the display screen, initiating display of the notification indicating the availability of the over-the-top content.

12. The method as in claim 11, wherein the over-the-top content includes relevant images associated with images in the particular segment of the corresponding content; and wherein initiating display of the over-the-top content includes initiating display of the relevant images.

13. The method as in claim 1 further comprising:

during the play back of the corresponding content, initiating display of a display notification on the display screen, the display notification encoded in a segment of the corresponding content, display of the display notification indicating availability of the over-the-top content for retrieval.

14. The method as in claim 1 further comprising:

in response to receiving the selection:

discontinuing play back of the corresponding content on the display screen;

storing a pointer value, the pointer value specifying a location in the corresponding content where play back of the corresponding content was discontinued.

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15. The method as in claim 14 further comprising:  
 during playback of the particular portion of the over-the-top content, receiving a command to resume play back of the corresponding content on the display screen; and  
 as specified by the command, resuming play back of the corresponding content at the location specified by the pointer value.

16. A method comprising:  
 initiating distribution of corresponding content over a primary broadcast channel of a communication link to a subscriber;  
 during playback of the corresponding content on a display screen, initiating display of a display notification to the subscriber, the display notification indicating availability of over-the-top content;  
 as a response to the display notification, receiving selection of the over-the-top content from the subscriber, the over-the-top content being supplemental content associated with the corresponding content distributed over the primary broadcast channel; and  
 in response to receiving the selection, transmitting the over-the-top content in a secondary channel of the communication link to the subscriber;  
 wherein the over-the-top content transmitted over the secondary channel is linear scheduled content in which the over-the-top content is scheduled for distribution in the respective time slot, a first portion of the over-the-top content synchronized for playback at a time of playing back a first segment of the corresponding content, a second portion of the over-the-top content synchronized for playback at a time of playing back a second segment of the corresponding content;  
 wherein the over-the-top content is a data stream; and  
 wherein transmitting the over-the-top content includes:  
   receiving timing information indicating a current play back location in the corresponding content played back on the display screen;  
   correlating the timing information to a corresponding location in the data stream;  
   transmitting, over the secondary channel, the over-the-top content at the corresponding location in the data stream for display of the over-the-top content at the corresponding location on the display screen.

17. The method as in claim 16, wherein availability of portions of the over-the-top content for play back by the subscriber varies depending on which particular portion of the corresponding content is being broadcasted to the subscriber over the primary broadcast channel.

18. The method as in claim 17, wherein the primary broadcast channel is a linear channel in which the corresponding content is scheduled for broadcast in a respective time slot in the primary broadcast channel.

19. The method as in claim 18, wherein the over-the-top content transmitted on the secondary channel is non-video content, different portions of which are available for distribution to the subscriber depending on a location of the corresponding content being viewed on the display screen.

20. The method as in claim 16 further comprising:  
 encoding the content distributed over the primary broadcast channel to include a displayable notification indicating availability of the over-the-top content for retrieval.

21. The method as in claim 16, wherein the display notification is assigned for play back with respect to a particular segment of the corresponding content, the method further comprising:

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in response to detecting current play back of the particular segment of the corresponding content on the display screen, initiating display of the display notification indicating the availability of the over-the-top content, the over-the-top content including relevant images associated with the particular segment of the corresponding content; and  
 wherein initiating display of the over-the-top content includes initiating display of the relevant images.

22. The method as in claim 16, wherein the display notification is encoded in a segment of the corresponding content transmitted over the primary broadcast channel.

23. A computer system comprising:  
 computer processor hardware; and  
 a hardware storage resource storing instructions that, when executed by the computer processor hardware, cause the computer processor hardware to perform operations of:  
 on a display screen, initiating play back of corresponding content received on a primary broadcast channel selected amongst multiple available channels;  
 during the play back of the corresponding content received on the primary broadcast channel on the display screen, receiving selection of over-the-top content available over a secondary channel with respect to the primary broadcast channel, the over-the-top content being supplemental content associated with the corresponding content in the primary broadcast channel; and  
 in response to receiving the selection during the play back: i) retrieving the over-the-top content, and ii) initiating play back of the over-the-top content on the display screen;  
 wherein the over-the-top content received on the secondary channel is linear scheduled content in which the over-the-top content is scheduled for distribution in the respective time slot, a first portion of the over-the-top content synchronized for playback at a time of playing back a first segment of the corresponding content, a second portion of the over-the-top content synchronized for playback at a time of playing back a second segment of the corresponding content;  
 wherein the over-the-top content is a data stream; and  
 wherein retrieving the over-the-top content includes:  
   obtaining timing information indicating a current play back location in the corresponding content played back on the display screen;  
   forwarding the timing information to a server resource distributing the over-the-top content, the server resource correlating the timing information to a corresponding location in the data stream;  
   from the server resource, receiving the over-the-top content at the corresponding location in the data stream; and  
   initiating, on the display screen, display of the over-the-top content at the corresponding location.

24. The computer system as in claim 23, wherein availability of portions of the over-the-top content for play back on the display screen from the secondary channel varies depending on which particular portion of the corresponding content is being broadcasted to subscribers in a cable network environment.

25. The computer system as in claim 24, wherein the primary broadcast channel is a linear channel in which the corresponding content is scheduled for broadcast in a respective time slot in the primary broadcast channel.

26. The computer system as in claim 25, wherein the over-the-top content received on the secondary channel is non-

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video content, different portions of which are available depending on a location of the corresponding content being viewed on the display screen.

27. The computer system as in claim 23, wherein the secondary channel delivers the over-the-top content as scheduled content. 5

28. The computer system as in claim 23, wherein the stored instructions cause the computer processor hardware to perform further operations of:

storing the corresponding content received over the primary channel; 10

storing the over-the-top content received over the secondary channel, the over-the-top content time synchronized with respect to the corresponding content via synchronization information; and 15

utilizing the synchronization information to switch between play back of the corresponding content and the over-the-top content on the display screen.

29. Computer-readable storage hardware having instructions stored thereon, the instructions, when carried out by computer processor hardware, causes the computer processor hardware to perform operations of: 20

on a display screen, initiating play back of corresponding content received on a primary broadcast channel selected amongst multiple available channels; 25

during the play back of the corresponding content received on the primary broadcast channel on the display screen, receiving selection of over-the-top content available over a secondary channel with respect to the primary broadcast channel, the over-the-top content being

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supplemental content associated with the corresponding content in the primary broadcast channel; and

in response to receiving the selection during the play back: i) retrieving the over-the-top content, and ii) initiating play back of the over-the-top content on the display screen;

wherein the over-the-top content received on the secondary channel is linear scheduled content in which the over-the-top content is scheduled for distribution in the respective time slot, a first portion of the over-the-top content synchronized for playback at a time of playing back a first segment of the corresponding content, a second portion of the over-the-top content synchronized for playback at a time of playing back a second segment of the corresponding content;

wherein the over-the-top content is a data stream; and

wherein retrieving the over-the-top content includes:

obtaining timing information indicating a current play back location in the corresponding content played back on the display screen;

forwarding the timing information to a server resource distributing the over-the-top content, the server resource correlating the timing information to a corresponding location in the data stream;

from the server resource, receiving the over-the-top content at the corresponding location in the data stream; and

initiating, on the display screen, display of the over-the-top content at the corresponding location.

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